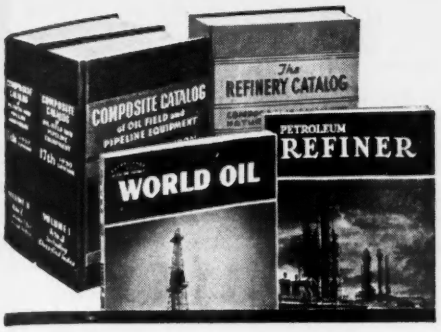

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for the drilling-producing-pipe line industry

PETROLEUM REFINER and The REFINERY CATALOG
for the refining-natural gasoline industry

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Editor's Page

A TRIBUTE TO INCENTIVE

IN SUCCESSFULLY MEETING greatly increased demand for petroleum products, the U. S. oil industry established numerous new records in 1950 as operations hit an all-time peak. Among the marks which went by the board were those for well completions, refinery crude runs, production of motor fuel, distillate fuel oil, natural gasoline and natural gas. No other nation can match the accomplishments constantly being performed by American oil men.

The industry's remarkable accomplishments in 1950 constitute a clear demonstration of the benefits offered to the American people by vigorous industries operating under a free competitive business system. Beyond this, the achievements are a high tribute to the individual opportunities offered by the incentive workings of the American business system.

• • •

THE SPARK of the American business system is incentive. More than anything else it is the lure of financial reward that causes people to bestir themselves.

It was financial incentive that prompted hundreds of American oil men and companies to make capital expenditures of more than $2 billion last year, which resulted in the expansion of the nation's drilling, producing, pipe line, refining and marketing facilities to the point that greatly increased petroleum wants of the people of this country were satisfactorily met. If there had been no chance of making a profit or there had not been intense competition, far fewer wells would have been drilled and much less expansion of refining facilities would have taken place.

With oil so vital to the defense of the nation, these accomplishments are highly reassuring. They indicate that American oil men may be counted upon to provide all the oil needed for both peace and war, if they are given continued freedom to operate under an incentive competitive system.

• • •

THE GREATEST DETERRENT to continued expansion of this country's living standards is the prospect that future conditions will not provide worthwhile financial returns for individual enterprise to incite men to real creative and productive effort.

The U. S. is engaged in a battle against the communist kind of government that is doing more than anything else to kill incentive. This means that this country does not want an incentive-killing system. However, too many fail to realize that incentive can be killed by our own government's bureaucracy as well as it can by the Russians.

Since the beginning of the Roosevelt New Deal era there have been many proposals to restrain, curb and check initiative. Too many of these programs already have come into existence, but new additional incentive killing plans continue to be proposed.

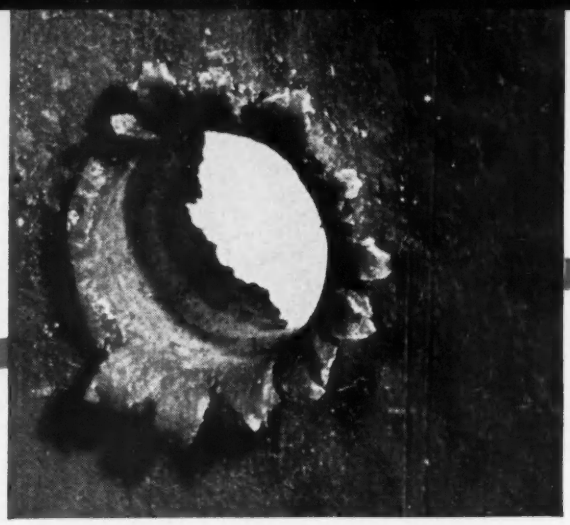
Already the incentive of the American business system has been greatly dulled, and there is grave danger that this trend will continue to creep quietly upon us before it is realized what is happening.

• • •

THE OPEN DOOR TO OPPORTUNITY must be maintained, so energetic men who take risks can hope for rewards. Otherwise, man's initiative, ingenuity, energy and courage will be stifled to the everlasting detriment of the American people.

Warren L. Baker

DANGER

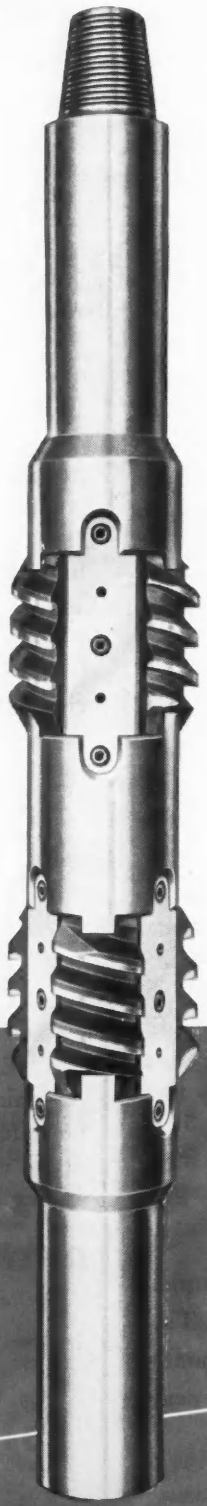


DO NOT RUN packers, testers, swabs or retainers

...until the "working surface" of your casing is clean

This typical burr resulting from a gun-shot hole, clearly shows why so many operators always consider it a "must" to clean the WORKING SURFACE—the vital inner wall of casing—with the new Baker ROTO-VERT Casing Scraper.

It is easy to see why tools with rubber cups, or a rubber packing element, many times fail to set properly, and often are cut, torn and hopelessly damaged while running-in the well. Ninety-nine times out of a hundred, premature setting of packers, testers and retainers, or their failure to effect a leak-proof pack-off, is due *not* to faulty construction or operation of the tool, but to burrs, cement, hardened mud, or other obstructions which . . . PREVENT PASSAGE OF THE SLIPS • CUT OR OTHERWISE DAMAGE THE PACKING ELEMENT; *or* • PRESENT SUCH A ROUGH, UNEVEN SURFACE THAT A LEAK-PROOF PACK-OFF IS IMPOSSIBLE.



The new Baker Model "C" ROTO-VERT Casing Scraper is a helix-blade-type scraper which can be either rotated or "spudded" (reciprocated vertically) for the removal of perforation burrs, imbedded bullets, cement sheath or other obstructions from the inner wall of casing. The body is machined from bar stock, with two sets of machined (not cast) blades positioned for overlapping, 360-degree scraping coverage.

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PRODUCT NO. 620-C

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The Changing Panorama

1950-51

By L. J. LOGAN, Associate Editor

DURING 1951 as in the latter half of 1950, the petroleum industry of the U. S. will be extremely busy, pushing operations to new record levels, in supplying products that will be required in unprecedented volumes. Military needs for oils will be greater than in recent years, and civilian consumption will be greater than ever before. For there are now more motor vehicles in use than at any time in the past, and the same is true of oil burners for heating homes, diesel locomotives, tractors and other oil-using farm equipment; and record-setting industrial production will require proportionately large volumes of fuel oils and lubricants.

Petroleum products will be in strong demand by ocean-going tankers, inland waterway boats, railroads, electric power utilities, mines and smelters, and chemical plants. To name all the uses for which oils will be needed in great volume in this coming critical year would be to diagram the whole economy of the most highly petroleumized nation on earth. Oil is the lifeblood of the nation, and a time of crisis stimulates the flow.

The new records in demand for petroleum products in 1951 are indicated in spite of probable further declines in exports and will reflect increased domestic use.

To meet the large requirements, there will likely be some further increases in imports of both crude petroleum and refined products, additional gain in natural gasoline production, and a marked increase in domestic production of crude oil, while crude runs to stills at U. S. refineries will reach new highs. Because of higher demand, some increase of stocks of refined products appears advisable and probably will occur. Natural gas production will continue to increase, with further expansion of transmission and distribution systems helping to meet the nation's fuel requirements.

Although pipe line construction was more extensive in 1950 than in the previous year, another active year is expected in 1951, despite a scarcity of pipe, as transportation facilities have to be kept in line with production and other operations to avoid bottlenecks.

In order to have enough oil the nation must consistently drill enough wells, including wildcats that open new fields, because time constantly is taking its toll of producing wells that reach the stage of exhaustion and abandonment. Over a period of years, assuming no material change in quality of new wells completed, the nation would have to drill a gradually increasing number of wells per year to take care of constantly increasing production of oil. It is justifiable, therefore, that the industry contemplates drilling more wells in 1951 than the record number completed in 1950. Operators propose to step up wildcatting by a larger percentage than total drilling. The necessity of drilling deeper in completing new wells still prevails, and total footage to be drilled in 1951 will show a greater increase than the number of wells completed, it is indicated. These are the preliminary plans of operators, as revealed in a survey by WORLD OIL. The plans may have to be revised, of course, as shortages of materials or manpower could force some curtailment, while on the other hand, military or other developments might lead to more drilling than now projected.

In any event, the nation henceforth must keep a watchful eye on domestic petroleum reserves and strive constantly to maintain and increase them through vigorous wildcatting and development. U. S. reserves are now greater than ever before, but so is the drain upon them in meeting the nation's oil needs, in spite of unprecedented imports. Although they come mostly from the Caribbean area, imports might be interrupted in an emergency, and a substantial reserve of domestic oil producing ability is highly essential.

In recognition of the constant need for new fields to bolster reserves, the industry is maintaining an active program of geophysical and core drilling work, endeavoring to find prospects that promise to yield oil and gas. There are now more geophysical and core drilling crews at work in the U. S. than there were a year ago but not as many as at the close of busy 1948. Under present conditions, a further stepping up of the pre-drilling prospecting seems advisable and likely to occur.

In other countries as well as the U. S., postwar years have brought active development and expansion of the petroleum industry, and further gains are in prospect for 1951, indicating that new records will be set in world demand for oils and in world production. There has been extensive refinery construction in Western Europe, and those new facilities will make increased demands upon the Middle East for crude supplies, which now can be more easily delivered with benefit of the new pipe line systems lately completed in the Middle East. Canada's oil industry, expanded greatly in 1950, will continue vigorous growth and expansion in 1951.

An important question confronting the U. S. oil industry for 1951 is whether operations will be seriously disturbed by shortages of materials and skilled workers. The industry is confident that it can do a very creditable job of supplying military and essential civilian requirements, provided it is not handicapped too much by governmental restrictions and economic forces beyond its control. Through Petroleum Administration for Defense, the government so far has helped to solve current problems of the industry, and this cooperation probably will continue.

However, increasing and tightening controls throughout the economy may have adverse implications for the pertoleum industry as well as other lines. Price controls, for example, could cause serious trouble, as they did during World War II, when oil prices were kept tightly frozen,

despite sharply higher oil industry costs, with the result that essential drilling and other developments were seriously discouraged. At present oil prices again are frozen, while industry costs embody increases that have never been reflected by the oil prices, with additional increases working into prices and wages paid out by the industry. It has been proved before that ceilings on prices, with their inevitable inequalities, restrict production and aggravate scarcities, and the same result can be expected now, in the oil industry as well as other sections of the economy.

Government policy and action in regard to other matters also will have much to do with the effectiveness of oil industry operations. Especially important is it that the industry not be subjected to unsound taxation, such as that which previously has been sought unsuccessfully, seeking to cut or eliminate the percentage depletion allowance.

Increases in operations and setting of new records now indicated for 1951 would be surpassing extraordinary results of 1950. For in numerous categories, the achievements of 1950 made history or established new records.

Salient Annual Statistics of the United States

ITEM	THOUSANDS OF BARRELS, EXCEPT AS NOTED				
	1949	1950	Percent Change '49-'50	1951 Forecast	Percent Change '50-'51
Total Demand, All Oils	**2,233,682**	**2,481,710**	**+ 11.1**	**2,614,000**	**+ 5.3**
(Daily Average)	6,119	6,799	+ 11.1	7,162	+ 5.3
Motor Fuel Demand	952,434	1,017,346	+ 6.8	1,107,000	+ 8.8
(Daily Average)	2,609	2,787	+ 6.8	3,033	+ 8.8
Kerosine Demand	104,684	119,058	+ 13.7	128,000	+ 7.5
(Daily Average)	287	366	+ 13.7	351	+ 7.5
Residual Fuel Oil Demand	507,962	568,241	+ 11.9	572,000	+ 0.7
(Daily Average)	1,392	1,557	+ 11.9	1,567	+ 0.7
Distillate Fuel Oil Demand	340,219	407,133	+ 19.7	437,000	+ 7.3
(Daily Average)	932	1,115	+ 19.7	1,197	+ 7.3
Lubricating Oils Demand	46,013	53,550	+ 16.4	.....	.....
(Daily Average)	126	147	+ 16.4	.....	.....
Domestic Demand, Total	**2,114,207**	**2,373,704**	**+ 12.3**	**2,527,000**	**+ 6.5**
(Daily Average)	5,792	6,503	+ 12.3	6,923	+ 6.5
Exports, Total	**119,475**	**108,006**	**— 9.6**	**87,000**	**— 19.4**
(Daily Average)	327	296	— 9.6	238	— 19.4
Crude Oil Exports	33,069	35,031	+ 5.9	26,000	— 25.8
(Daily Average)	90	96	+ 5.9	71	— 25.8
Refined Oil Exports	86,406	72,975	— 15.6	61,000	— 16.4
(Daily Average)	237	200	— 15.6	167	— 16.4
Crude Runs to Stills, Total	**1,945,519**	**2,093,167**	**+ 7.6**	**2,244,020**	**+ 7.2**
(Daily Average)	5,330	5,735	+ 7.6	6,148	+ 7.2
Demand for Crude, Total	**1,998,500**	**2,155,052**	**+ 7.8**	**2,295,000**	**+ 6.5**
(Daily Average)	5,475	5,904	+ 7.8	6,288	+ 6.5
Demand for Domestic Crude	1,843,578	1,978,354	+ 7.3	2,092,000	+ 5.7
(Daily Average)	5,051	5,420	+ 7.3	5,732	+ 5.7
Crude Oil Production	**1,840,307**	**1,972,812**	**+ 7.2**	**2,092,000**	**+ 6.0**
(Daily Average)	5,042	5,405	+ 7.2	5,732	+ 6.0
Value at Wells, $ Thousand	4,692,783	5,070,127	+ 8.0	5,397,360	+ 6.5
Average Value, $ per Barrel	2.55	2.57	+ 0.8	2.58	+ 0.4
Imports, All Oils	**234,131**	**309,009**	**+ 32.0**	**341,000**	**+ 10.4**
(Daily Average)	641	846	+ 32.0	934	+ 10.4
Crude Petroleum Imports	154,922	176,698	+ 14.1	203,000	+ 14.9
(Daily Average)	424	484	+ 14.1	556	+ 14.9
Refined Products Imports	79,209	132,311	+ 67.0	138,000	+ 4.3
(Daily Average)	217	362	+ 67.0	378	+ 4.3
Stocks End of Year, All Oils	**602,891**	**584,314**	**— 3.1**	**600,000**	**+ 2.7**
Crude Oil Stocks	253,356	247,814	— 2.2	248,000	+ 0.1
Natural Gasoline Stocks	6,831	8,200	+ 20.0	8,000	— 2.4
Refined Products Stocks	342,704	328,300	— 4.2	344,000	+ 4.8
Motor Fuel Oil Stocks	110,417	117,253	+ 6.2	.....	.....
Kerosine Stocks	20,888	20,217	— 3.2	.....	.....
Residual Fuel Oil Stocks	60,193	41,184	— 31.6	.....	.....
Distillate Fuel Oil Stocks	75,207	70,875	— 5.8	.....	.....
Lubricating Oil Stocks	9,219	7,100	— 23.0	.....	.....

Total demand for all oils was at a new high and exceeded 1949 by the large amount of 11.1 percent. The gain forecast for 1951 is 5.3 percent. Requirements of distillate fuel oil were up nearly 20 percent in 1950, and there were gains of approximately 12 percent for residual fuel oil, 14 percent for kerosine, and nearly 7 percent for motor fuel. For 1951, anticipated increases are 7.3 percent for distillate, 0.7 percent for residual, 7.5 percent for kerosine, and 8.8 percent for motor fuel. Exports were off nearly 10 percent in 1950 and probably will further decline. But domestic consumption of all oils was up over 12 percent in 1950 and is expected to rise further by 6.5 percent in 1951.

Crude runs to stills in 1950, averaging 5,735,000 barrels daily, were 405,000 a day or 7.6 percent above 1949, and are expected to increase 413,000 barrels daily or 7.2 percent to approximately 6,150,000 daily in 1951.

Domestic production of crude oil was up 363,000 barrels daily or 7.2 percent in 1950 in averaging 5,405,000 barrels per day, and is expected to rise 327,000 barrels a day or 6 percent more to an average of 5,732,000 daily in 1951.

Total imports rose from 641,000 barrels daily in 1949 to 846,000 daily in 1950 and are expected to increase further to about 934,000 barrels per day in 1951.

Salient Annual Statistics of the United States

ITEM	NUMBER, EXCEPT AS NOTED				
	1949	1950	Percent Change '49-'50	1951 Forecast	Percent Change '50-'51
Natural Gasoline Production, Thous. Bbls.	**156,203**	**180,922**	**+ 15.8**	**197,000**	**+ 8.9**
(Daily Average)	428	496	+ 15.8	540	+ 8.9
Natural Gas, Marketed Production, Biln. Cu. Ft.	**5,420**	**5,975**	**+ 10.2**	**6,500**	**+ 8.8**
Value at Consumption Points, ¢ per M. Cu. Ft.	25.4	25.5	+ 0.4	25.5	.....
Value at Wells, ¢ per M. Cu. Ft.	6.3	6.1	+ 3.2	6.1	.....
Pipe Line Construction, Miles	**12,564**	**16,120**	**+ 28.3**	.....	.....
Oil Lines Completed, Miles	3,634	2,843	— 21.8	.....	.....
Gas Lines Completed, Miles	8,493	10,854	+ 27.8	.....	.....
Product Lines Completed, Miles	437	2,423	+454.5	.....	.....
Crude Reserves, Year-End, Miln. Bbls.	**24,649**	**26,218**	**+ 6.4**	**27,650**	**+ 5.5**
New Crude Reserves Proved, Miln. Bbls.	**3,188**	**3,515**	**+ 10.3**	**3,500**	**— 0.4**
New Fields and Pays Found	**1,264**	**1,347**	**+ 6.6**	.....	.....
New Oil Discoveries	**964**	**1,117**	**+ 15.9**	.....	.....
New Fields	668	816	+ 22.2	.....	.....
New Pays	296	301	+ 1.7	.....	.....
New Gas Discoveries	**179**	**145**	**— 19.0**	.....	.....
New Fields	130	126	— 3.1	.....	.....
New Pays	49	19	— 61.2	.....	.....
New Distillate Discoveries	**121**	**85**	**— 29.8**	.....	.....
New Fields	69	67	— 2.9	.....	.....
New Pays	52	18	— 65.4	.....	.....
Strict Wildcats Drilled	**6,781**	**7,780**	**+ 14.7**	**8,363**	**+ 7.5**
Productive	867	1,009	+ 16.4	.....	.....
Non-Productive	5,914	6,771	+ 14.5	.....	.....
Well Completions, Total	**39,497**	**43,939**	**+ 11.2**	.....	.....
New Wells, Total	38,962	43,204	+ 10.9	44,945	+ 4.0
Oil Wells	21,415	23,812	+ 11.2	.....	.....
Gas Wells	3,121	2,973	— 4.8	.....	.....
Distillate Wells	378	466	+ 23.3	.....	.....
Dry Holes	12,898	14,799	+ 14.7	.....	.....
Gas Input Wells	56	123	+ 19.6	.....	.....
Water Input Wells	1,036	928	— 10.4	.....	.....
Water Disposal Wells	58	103	— 22.4	.....	.....
Old Wells Drilled Deeper	535	735	+ 37.4	.....	.....
Footage Drilled, Thousand Feet	**139,063**	**159,978**	**+ 15.0**	.....	.....
Footage Drilled, New Wells, Thousand Feet	138,617	159,384	+ 15.0	170,556	+ 7.0
Wells Drilling, End of Year	**4,355**	**4,665**	**+ 7.6**	.....	.....
Producing Oil Wells, End of Year	**449,304**	**467,776**	**+ 4.1**	.....	.....
Flowing Oil Wells	51,335	53,587	+ 4.4	.....	.....
Pumping Oil Wells	397,969	414,189	+ 4.1	.....	.....

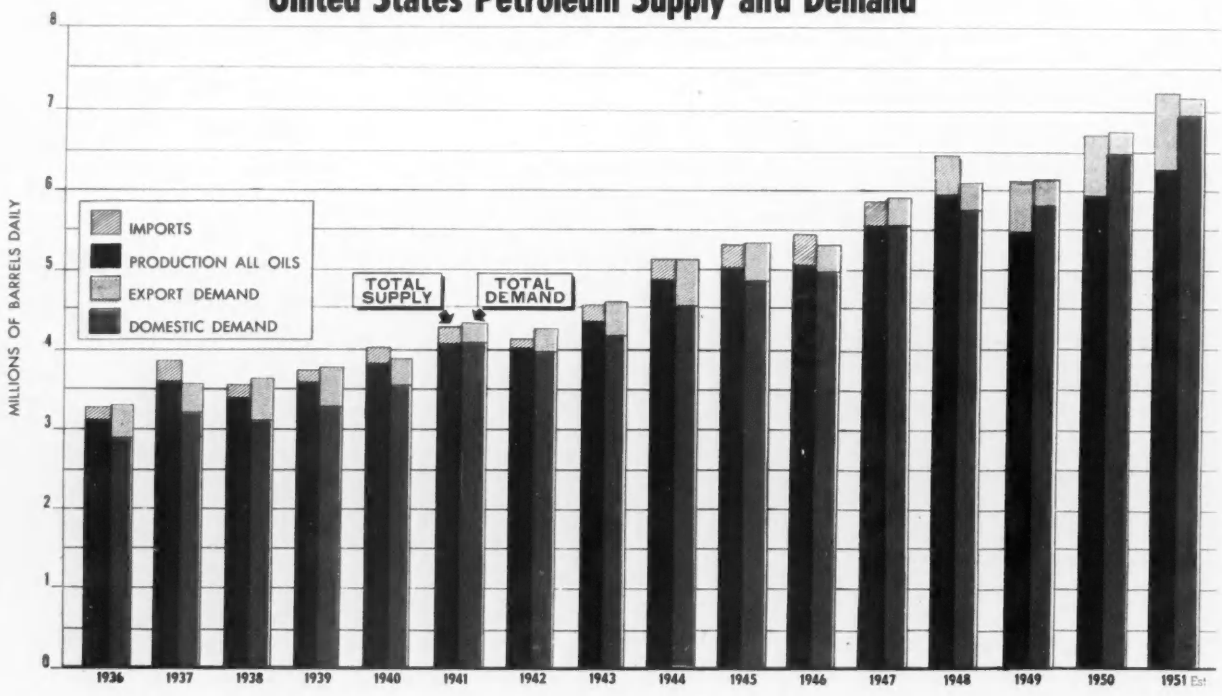
PETROLEUM DEMAND

To Require Record U. S. Production

PRODUCERS of crude oil in the U. S. will be called upon in 1951 to supply the greatest amount of production in the history of the nation, in meeting the anticipated record-breaking demand for petroleum products. Crude runs to stills are expected to be materially higher than ever before, to keep abreast of need for products, and while imports of crude and products will be higher than during the past year, domestic production of both crude oil and natural gasoline also will have to show substantial increases to balance supply with indicated demand.

To a limited extent, the higher production will be required to provide some buildup in stocks of refined products, in contrast with the situation in 1950, when new supply was somewhat short of demand, resulting in reduction of stocks of both products and crude.

United States Petroleum Supply and Demand



Thousands of Barrels Daily

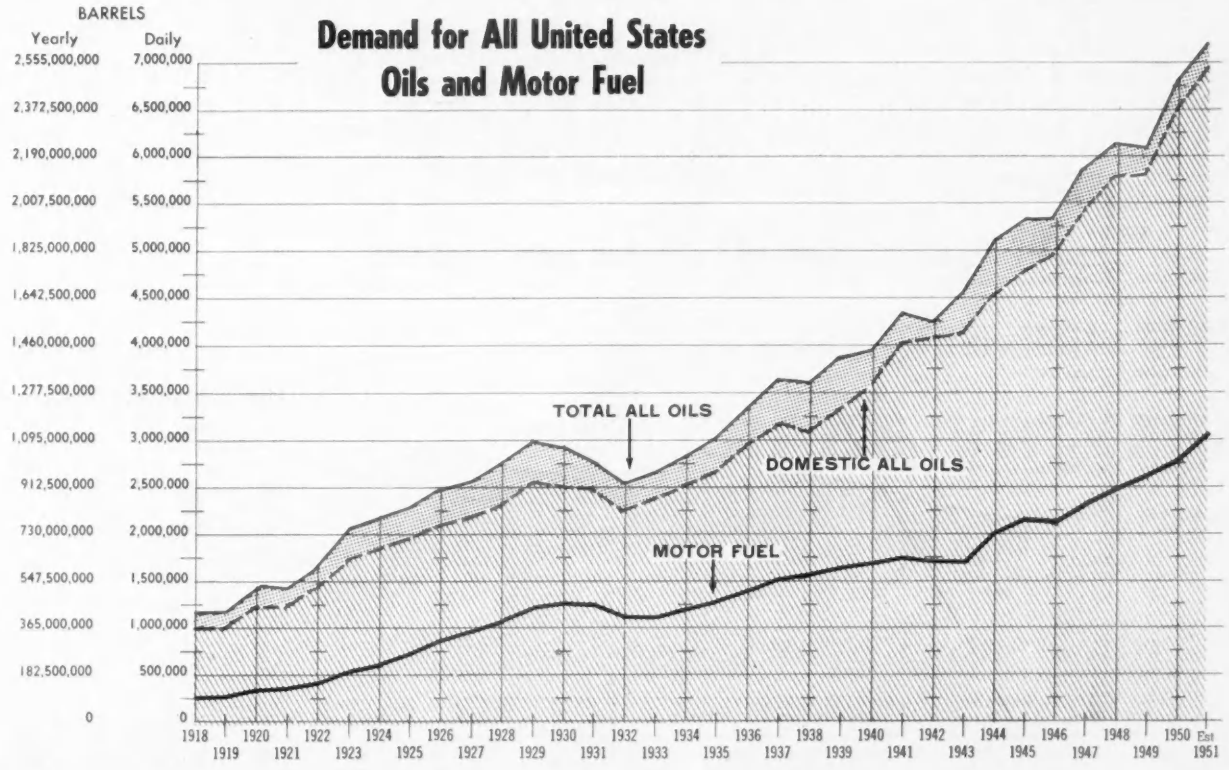
YEAR	SUPPLY: U.S. Prod. All Oils[1]	SUPPLY: Total Imports[2]	SUPPLY: Total New Supply	Change in Stocks All Oils[3]	DEMAND: Domestic Demand[4]	DEMAND: Exports and Shipments[5]	DEMAND: Total Demand
1936	3,128	156	3,284	—62	2,986	360	3,346
1937	3,647	157	3,804	+126	3,205	473	3,678
1938	3,472	149	3,621	—25	3,115	531	3,646
1939	3,614	162	3,776	—115	3,373	518	3,891
1940	3,858	229	4,087	+106	3,625	356	3,981
1941	4,073	266	4,339	—30	4,071	298	4,369
1942	4,034	99	4,133	—160	3,972	321	4,293
1943	4,372	174	4,546	—33	4,168	411	4,579
1944	4,864	252	5,116	—17	4,562	571	5,133
1945	5,010	311	5,321	—37	4,857	501	5,358
1946	5,073	377	5,450	+119	4,912	419	5,331
1947	5,451	437	5,888	—14	5,451	451	5,902
1948	5,921	514	6,435	+292	5,775	368	6,143
1949	5,470	641	6,111	—8	5,792	327	6,119
1950	5,901	846	6,747	—52	6,503	296	6,799
1951 Estimate	6,271	934	7,205	+44	6,923	238	7,161

[1] Includes crude oil, natural gasoline, related products, and benzol. [2] Includes both refined and crude oils. [3] Includes changes in both refined and crude oil stocks. Minus signs indicate decreases and plus signs increases. [4] Includes military and civilian demand in continental United States and shipments to U. S. armed forces abroad. [5] Includes shipments to non-contiguous territories.

Source: Data from U. S. Bureau of Mines, except November and December, 1950, estimated by WORLD OIL.

This outlook for record-breaking domestic production is indicated by the expected demand for petroleum products in 1951 as conservatively forecast by the U. S. Bureau of Mines. Its computations indicate the requirement for U. S. crude production averaging 5,732,000 barrels daily in 1951, an increase of 327,000 barrels per day or 6 per cent over the 5,405,000 daily in 1950.

This estimate assumes no change in 1951 in crude stocks but a net increase of 16 million barrels (44,000 daily) in stocks of refined products. It makes allowance for U. S. production of 540,000 barrels per day of natural gasoline and related products for partially meeting requirements, an increase of 8.8 percent over the 496,000 daily produced in 1950. The bureau



Demand for All Oils **Demand for Motor Fuel**

(All Figures in Barrels)

YEAR	TOTAL (Domestic and Export)		DOMESTIC		EXPORTS		TOTAL (Domestic and Export)		DOMESTIC		EXPORTS	
	Annual Total	Daily Average	Annual Total	Daily Average	Annual Total	Daily Average	Annual Total	Daily Average	Annual Total	Daily Average	Annual Total	Daily Average
1918							93,599,000	256,400	79,949,000	219,000	13,650,000	37,000
1919	438,434,000	1,201,200	374,541,000	1,026,100	63,893,000	175,100	97,790,000	267,900	88,648,000	242,900	9,142,000	25,000
1920	535,382,000	1,462,800	456,764,000	1,245,300	79,618,000	217,500	124,623,000	340,500	108,945,000	297,700	15,678,000	42,800
1921	592,402,000	1,450,400	457,521,000	1,253,300	71,881,000	196,900	130,203,000	356,700	116,840,000	320,100	13,363,000	36,600
1922	605,540,000	1,659,000	530,990,000	1,454,800	74,550,000	204,200	152,132,000	416,800	137,770,000	377,500	14,362,000	39,300
1923	754,361,000	2,066,700	652,027,000	1,786,400	102,334,000	280,300	195,556,000	535,800	174,462,000	478,000	21,094,000	57,800
1924	805,070,000	2,199,600	687,742,000	1,879,100	117,328,000	320,500	225,737,000	616,800	196,586,000	537,100	29,151,000	79,700
1925	840,818,000	2,303,600	726,797,000	1,991,200	114,021,000	312,400	264,429,000	724,500	232,745,000	637,700	31,684,000	86,800
1926	912,893,000	2,501,100	780,487,000	2,138,300	132,406,000	362,800	311,897,000	854,500	268,128,000	734,600	43,769,000	119,900
1927	944,762,000	2,588,400	802,499,000	2,198,600	142,263,000	389,800	350,318,000	959,800	305,367,000	836,600	44,951,000	123,200
1928	1,014,716,000	2,772,400	859,759,000	2,349,000	154,957,000	423,400	392,293,000	1,071,800	338,881,000	925,900	53,412,000	145,900
1929	1,103,203,000	3,022,500	940,083,000	2,575,600	163,120,000	446,900	444,937,000	1,219,000	382,878,000	1,049,000	62,059,000	170,000
1930	1,083,511,000	2,968,500	927,016,000	2,539,800	156,495,000	428,700	463,184,000	1,269,000	397,609,000	1,089,300	65,575,000	179,700
1931	1,027,274,000	2,814,500	902,920,000	2,473,800	124,354,000	340,700	453,559,000	1,242,600	407,843,000	1,117,400	45,716,000	125,200
1932	938,757,000	2,564,900	835,482,000	2,282,700	103,275,000	282,200	413,229,000	1,129,000	377,791,000	1,032,200	35,438,000	96,800
1933	975,214,000	2,671,800	868,487,000	2,379,400	106,727,000	292,400	409,815,000	1,122,800	380,494,000	1,042,500	29,321,000	80,300
1934	1,034,672,000	2,834,700	920,165,000	2,521,000	114,507,000	313,700	435,025,000	1,191,800	410,339,000	1,124,200	24,686,000	67,600
1935	1,112,672,000	3,048,400	983,685,000	2,695,000	128,987,000	353,400	465,423,000	1,275,100	434,810,000	1,191,200	30,613,000	83,900
1936	1,224,748,000	3,346,300	1,092,754,000	2,985,700	131,994,000	360,600	510,252,000	1,394,100	481,606,000	1,315,800	28,646,000	78,300
1937	1,342,516,000	3,678,100	1,169,682,000	3,204,600	172,834,000	473,500	557,658,000	1,527,800	519,352,000	1,422,900	38,306,000	104,900
1938	1,330,850,000	3,646,200	1,137,122,000	3,115,400	193,728,000	530,800	573,112,000	1,570,200	523,003,000	1,432,900	50,109,000	137,300
1939	1,420,035,000	3,890,500	1,231,067,000	3,372,800	188,959,000	517,700	600,147,000	1,644,200	555,509,000	1,521,900	44,638,000	122,300
1940	1,457,086,000	3,981,100	1,326,620,000	3,624,600	130,466,000	356,500	614,867,000	1,679,900	589,490,000	1,610,600	25,377,000	69,300
1941	1,594,609,000	4,368,800	1,485,779,000	4,070,600	108,830,000	298,200	694,588,000	1,903,000	667,505,000	1,828,800	27,083,000	74,200
1942	1,566,815,000	4,292,600	1,449,908,000	3,972,300	116,907,000	320,300	624,207,000	1,710,200	589,110,000	1,614,000	35,097,000	96,200
1943	1,671,383,000	4,579,100	1,521,426,000	4,168,300	149,957,000	410,800	619,815,000	1,698,100	568,238,000	1,556,800	51,577,000	141,300
1944	1,878,879,000	5,133,600	1,671,263,000	4,566,300	207,616,000	567,300	733,019,000	2,002,800	632,482,000	1,728,100	100,537,000	274,700
1945	1,955,668,000	5,358,000	1,772,685,000	4,856,700	182,983,000	501,300	784,392,000	2,149,000	696,333,000	1,907,800	88,059,000	241,200
1946	1,945,909,000	5,331,200	1,792,786,000	4,911,700	153,123,000	419,500	780,751,000	2,139,000	735,417,000	2,014,800	45,334,000	124,200
1947	2,154,280,000	5,902,100	1,989,803,000	5,451,500	164,477,000	450,600	842,464,000	2,308,100	795,015,000	2,178,100	47,449,000	130,000
1948	2,248,352,000	6,143,000	2,113,678,000	5,775,100	134,674,000	368,000	908,572,000	2,482,400	871,270,000	2,380,500	37,302,000	101,900
1949	2,233,682,000	6,119,700	2,114,207,000	5,792,400	119,475,000	327,300	952,434,000	2,609,400	912,955,000	2,501,200	39,479,000	108,200
1950	2,481,710,000	6,799,200	2,373,704,000	6,503,300	108,006,000	295,900	1,017,346,000	2,787,300	994,500,000	2,724,700	22,846,000	62,600
1951 Est.	2,614,000,000	7,161,600	2,527,000,000	6,923,300	87,000,000	238,300	1,107,000,000	3,032,900	1,089,000,000	2,983,600	18,000,000	49,300

Source: U. S. Bureau of Mines, except November and December, 1950, estimated with aid of A.P.I. Reports.

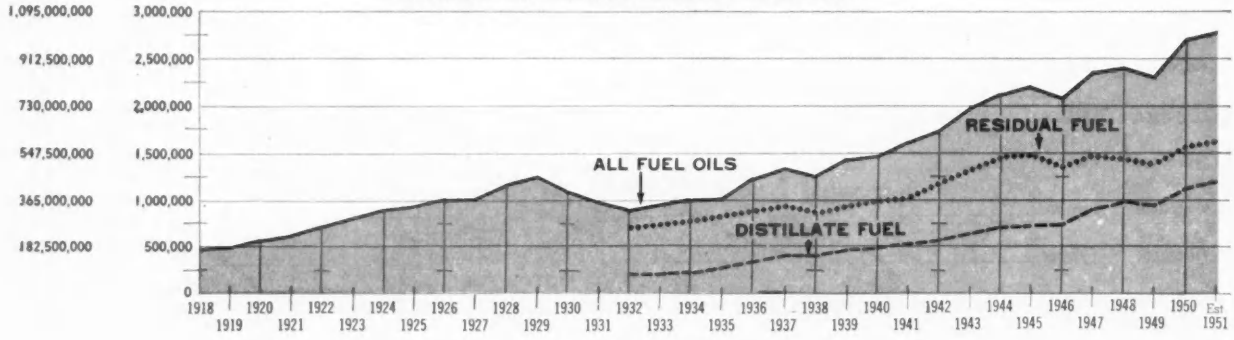
estimates finally that needs will be met to the extent of 934,000 barrels daily by imports, an increase of 10.4 percent over those of 846,000 daily in 1950. The 934,000 barrels a day of imports would include 556,000 of crude, up 14.9 percent over 484,000 daily in 1950, and 378,000 daily of refined products, up 4.3 percent from 362,000 daily in 1950.

In its forecast for 1951, embodied in the monthly forecast for December, 1950, the Bureau of Mines pointed out that "Any forecast of demand for 1951 is extremely uncertain at the present time. It is believed that the estimates for the first half of 1951 may approximate actual requirements. Estimates for the last half of the year have been included to indicate supplies required at the demand level estimated. Production and refinery operations could be increased materially in the last half of the year if necessary."

While the Bureau figured the demand for domestic crude at 5,732,000 barrels daily average for 1951, requirements are expected to increase gradually as the year progresses. By quarters, requirements are estimated at 5,706,000 barrels daily in the first quarter, 5,731,000 in the second quarter, 5,734,000 in the third quarter, and 5,755,000 in the fourth quarter.

International developments, national policies, economic controls, and other factors may require considerable revision of the current forecast of crude production requirements. Furthermore, the demand for domestic crude output may vary from the above projected rates because of different actual trends from those forecast for changes in stocks and imports. As forecast, 44,000 barrels a day will be added to

Demand for United States Fuel Oils



All Figures in Barrels

YEAR	TOTAL DEMAND (Domestic and Export) Annual Total	TOTAL DEMAND (Domestic and Export) Daily Average	DOMESTIC DEMAND Annual Total	DOMESTIC DEMAND Daily Average	EXPORTS Annual Total	EXPORTS Daily Average
* All Fuel Oils (Distillate and Residual)						
1918	172,387,000	472,300	142,751,000	391,100	29,636,000	81,200
1919	180,290,000	494,000	163,803,000	448,800	16,487,000	45,200
1920	208,052,000	568,400	185,972,000	508,100	22,080,000	60,300
1921	218,332,000	598,100	195,656,000	536,000	22,676,000	62,100
1922	255,542,000	700,100	237,063,000	649,500	18,479,000	50,600
1923	294,760,000	807,500	261,388,000	716,100	33,372,000	91,400
1924	328,015,000	896,200	290,766,000	794,400	37,249,000	101,800
1925	343,092,000	940,000	307,004,000	841,100	36,088,000	98,900
1926	377,923,000	1,035,400	339,572,000	930,300	38,351,000	105,100
1927	386,656,000	1,059,300	339,265,000	929,500	47,391,000	129,800
1928	428,401,000	1,170,500	383,974,000	1,049,100	44,427,000	121,400
1929	454,307,000	1,244,700	415,156,000	1,137,400	39,151,000	107,300
1930	404,981,000	1,109,600	368,531,000	1,009,700	36,450,000	99,900
1931	363,899,000	997,000	334,668,000	916,900	29,231,000	80,100
1932	324,151,000	885,600	304,157,000	831,000	19,994,000	54,600
1933	344,268,000	943,200	323,705,000	886,900	20,563,000	56,300
1934	368,976,000	1,010,900	340,371,000	932,500	28,605,000	78,400
1935	395,671,000	1,084,000	366,723,000	1,004,700	28,948,000	79,300
1936	445,524,000	1,217,300	410,641,000	1,122,000	34,883,000	95,300
1937	487,788,000	1,336,400	442,355,000	1,211,900	45,433,000	124,500
1938	456,843,000	1,251,600	409,282,000	1,121,300	47,561,000	130,300
1939	507,966,000	1,391,700	458,461,000	1,256,100	49,505,000	135,600
1940	536,263,000	1,465,200	501,014,000	1,368,900	35,249,000	96,300
1941	587,285,000	1,609,000	556,246,000	1,524,000	31,039,000	85,000
1942	625,028,000	1,712,400	591,358,000	1,620,200	33,670,000	92,200
1943	714,969,000	1,958,800	675,118,000	1,849,600	39,851,000	109,200
1944	777,367,000	2,124,000	721,340,000	1,970,900	56,027,000	153,100
1945	794,672,000	2,177,200	749,507,000	2,053,500	45,165,000	123,700
1946	761,598,000	2,086,600	722,923,000	1,980,600	38,675,000	106,000
1947	857,283,000	2,348,700	816,783,000	2,237,800	40,500,000	110,900
1948	875,423,000	2,391,900	841,119,000	2,298,100	34,304,000	93,700
1949	848,181,000	2,323,800	823,351,000	2,255,800	24,830,000	68,000
1950	975,374,000	2,672,200	947,744,000	2,596,500	27,630,000	75,700
1951 Est	1,009,000,000	2,764,400	986,000,000	2,701,400	23,000,000	63,000

YEAR	TOTAL DEMAND (Domestic and Export) Annual Total	TOTAL DEMAND (Domestic and Export) Daily Average	DOMESTIC DEMAND Annual Total	DOMESTIC DEMAND Daily Average	EXPORTS Annual Total	EXPORTS Daily Average
Distillate Fuel Oil						
1932	73,883,000	201,900	65,101,000	177,900	8,782,000	24,000
1933	76,172,000	208,700	64,748,000	177,400	11,424,000	31,300
1934	89,330,000	244,700	74,824,000	205,000	14,506,000	39,700
1935	102,277,000	280,200	86,028,000	235,700	16,249,000	44,500
1936	123,205,000	336,600	102,757,000	280,800	20,448,000	55,800
1937	146,970,000	402,600	116,841,000	320,100	30,129,000	82,500
1938	147,090,000	403,000	117,449,000	321,800	29,641,000	81,200
1939	166,993,000	457,500	134,973,000	369,800	32,020,000	87,700
1940	179,991,000	491,800	160,851,000	439,500	19,140,000	52,300
1941	189,749,000	519,900	172,824,000	473,500	16,925,000	46,400
1942	207,236,000	567,700	185,661,000	508,600	21,575,000	59,100
1943	233,067,000	638,600	208,110,000	570,200	24,957,000	68,400
1944	252,811,000	690,700	209,320,000	571,900	43,491,000	118,800
1945	259,580,000	711,100	226,084,000	619,400	33,496,000	91,700
1946	272,381,000	746,300	242,894,000	665,500	29,487,000	80,800
1947	328,150,000	899,000	298,273,000	817,200	29,877,000	81,800
1948	361,869,000	988,700	340,576,000	930,500	21,293,000	58,200
1949	340,219,000	932,100	328,030,000	898,700	12,189,000	33,400
1950	407,133,000	1,115,400	394,823,000	1,081,700	12,310,000	33,700
1951 Est	437,000,000	1,197,300	428,000,000	1,172,600	9,000,000	24,700
Residual Fuel Oil						
1932	250,268,000	683,800	239,056,000	653,200	11,212,000	30,600
1933	268,096,000	734,500	258,957,000	709,500	9,139,000	25,000
1934	279,646,000	766,100	265,547,000	727,500	14,099,000	38,600
1935	293,394,000	803,800	280,695,000	769,000	12,699,000	34,800
1936	322,319,000	880,700	307,884,000	841,200	14,435,000	39,500
1937	340,818,000	933,700	325,514,000	891,800	15,304,000	41,900
1938	309,753,000	848,600	291,833,000	799,500	17,920,000	49,100
1939	340,973,000	934,200	323,488,000	886,300	17,485,000	47,900
1940	356,272,000	973,400	340,163,000	929,400	16,109,000	44,000
1941	397,536,000	1,089,100	383,422,000	1,050,400	14,114,000	38,700
1942	417,792,000	1,144,600	405,697,000	1,111,500	12,095,000	33,100
1943	481,902,000	1,320,300	467,008,000	1,279,500	14,894,000	40,800
1944	524,556,000	1,433,200	512,020,000	1,399,000	12,536,000	34,200
1945	535,092,000	1,466,000	523,423,000	1,434,000	11,669,000	32,000
1946	489,217,000	1,340,300	480,029,000	1,315,100	9,188,000	25,200
1947	529,133,000	1,449,700	518,510,000	1,420,600	10,623,000	29,100
1948	513,554,000	1,403,200	500,543,000	1,367,600	13,011,000	35,500
1949	507,962,000	1,391,600	495,321,000	1,357,000	12,641,000	34,600
1950	568,241,000	1,556,800	552,921,000	1,514,800	15,320,000	42,000
1951 Est	572,000,000	1,567,100	558,000,000	1,528,800	14,000,000	38,300

* Breakdown of fuel oils by distillates and residual grades not available prior to 1932; but breakdown for 1932 and subsequent years appears at right.
Source: U. S. Bureau of Mines, except November and December, 1950, estimated with aid of A.P.I. reports.

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stocks of refined products for the year, and crude stocks will remain unchanged. If product stocks actually are increased more than this or if crude stocks are increased, proportionally more crude production might be needed. Conversely, if total stocks are increased less than assumed, less crude production might be required. In similar manner, required domestic crude production would be higher if imports should be less than the projected 934,000 barrels daily, but lower if they exceed that rate. In the first half of January, imports were well in line with the forecast, having averaged 916,000 barrels daily, compared with the Bureau's forecast of 922,000 daily for the first quarter of 1951. (Crude imports were running less than the first quarter forecast but residual more than forecast.)

Crude runs to stills at U. S. refineries must average 6,148,000 barrels daily in 1951 to meet the demand for petroleum products as forecast. This would be an increase of 413,000 barrels daily or 7.2 percent over the runs of 5,735,000 barrels per day in 1950. The runs in 1950 had been 405,000 barrels a day or 7.6 percent above those of 5,330,000 daily in 1949 and exceeded the previous record of 5,549,-

Forecast of Petroleum Demand and Supply in 1951, Compared with 1950 and 1949

(All data from U. S. Bureau of Mines except November and December, 1950, estimated with aid of API statistical bulletins.)

(THOUSANDS OF BARRELS)

	1949	1950	% Diff. '49-'50	1951 Forecast	% Diff. '50-'51	1951 FORECAST BY QUARTERS 1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
DEMAND									
All Oils, Total Demand	**2,233,682**	**2,481,710**	**+ 11.1**	**2,614,000**	**+ 5.3**	**657,000**	**618,000**	**648,000**	**691,000**
(Daily Average)	6,119	6,799	+ 11.1	7,162	+ 5.3	7,300	6,791	7,043	7,511
Domestic Demand	2,114,207	2,373,704	+ 12.3	2,527,000	+ 6.5	634,000	594,000	627,000	672,000
(Daily Average)	5,792	6,503	+ 12.3	6,923	+ 6.5	7,044	6,527	6,815	7,304
Exports, Total	119,475	108,006	— 9.6	87,000	— 19.4	23,000	24,000	21,000	19,000
(Daily Average	327	296	— 9.6	238	— 19.4	256	264	228	206
Crude Exports	33,069	35,031	+ 5.9	26,000	— 25.8	6,000	8,000	7,000	5,000
(Daily Average)	90	96	+ 5.9	71	— 25.8	67	88	76	54
Refined Products	86,406	72,975	— 15.6	61,000	— 16.4	17,000	16,000	14,000	14,000
(Daily Average)	237	200	— 15.6	167	— 16.4	189	176	152	152
Motor Fuel, Total Demand	**952,434**	**1,017,346**	**+ 6.8**	**1,107,000**	**+ 8.8**	**236,000**	**290,000**	**301,000**	**280,000**
(Daily Average)	2,609	2,787	+ 6.8	3,033	+ 8.8	2,622	3,187	3,272	3,043
Domestic Demand	912,955	994,500	+ 8.9	1,089,000	+ 9.5	231,000	285,000	297,000	276,000
(Daily Average)	2,501	2,725	+ 8.9	2,984	+ 9.5	2,567	3,132	3,228	3,000
Exports	39,479	22,846	— 42.1	18,000	— 21.2	5,000	5,000	4,000	4,000
(Daily Average)	108	62	— 42.1	49	— 21.2	56	55	43	43
Kerosine, Total Demand	**104,684**	**119,058**	**+ 13.7**	**128,000**	**+ 7.5**	**42,000**	**21,000**	**24,000**	**41,000**
(Daily Average)	287	326	+ 13.7	351	+ 7.5	467	231	261	445
Domestic Demand	102,152	117,103	+ 14.6	126,000	+ 7.6	41,500	20,500	23,500	40,500
(Daily Average)	280	321	+ 14.6	345	+ 7.6	461	225	255	440
Exports	2,532	1,955	— 22.8	2,000	+ 2.3	500	500	500	500
(Daily Average)	7	5	— 22.8	5	+ 2.3	6	5	5	5
Distillate Fuel Oil, Total Demand	**340,219**	**407,133**	**+ 19.7**	**437,000**	**+ 7.3**	**141,000**	**83,000**	**85,000**	**128,000**
(Daily Average)	932	1,115	+ 19.7	1,197	+ 7.3	1,567	912	924	1,391
Domestic Demand	328,030	394,823	+ 20.4	428,000	+ 8.4	138,000	81,000	83,000	126,000
(Daily Average)	899	1,081	+ 20.4	1,173	+ 8.4	1,533	890	902	1,370
Exports	12,189	12,310	+ 1.0	9,000	— 26.9	3,000	2,000	2,000	2,000
(Daily Average)	33	34	+ 1.0	25	— 26.9	33	22	22	22
Residual Fuel Oil, Total Demand	**507,962**	**568,241**	**+ 11.9**	**572,000**	**+ 0.7**	**155,000**	**131,000**	**135,000**	**151,000**
(Daily Average)	1,392	1,557	+ 11.9	1,567	+ 0.7	1,722	1,440	1,467	1,641
Domestic Demand	495,321	552,921	+ 11.6	558,000	+ 0.9	151,000	127,000	132,000	148,000
(Daily Average)	1,357	1,515	+ 11.6	1,529	+ 0.9	1,678	1,396	1,435	1,609
Exports	12,641	15,320	+ 21.2	14,000	— 8.6	4,000	4,000	3,000	3,000
(Daily Average)	35	42	+ 21.2	38	— 8.6	44	44	33	33
***All Other Oils, Total Demand**	**328,383**	**369,932**	**+ 12.7**	**370,000**	**+ 0.2**	**83,000**	**93,000**	**103,000**	**91,000**
(Daily Average)	899	1,014	+ 12.7	1,014	+ 0.2	922	1,021	1,119	991
Domestic Demand	275,749	314,357	+ 14.0	326,000	+ 3.7	72,500	80,500	91,500	81,500
(Daily Average)	755	861	+ 14.0	892	+ 3.7	805	884	995	885
Exports	52,634	55,575	+ 5.6	44,000	— 20.8	10,500	12,500	11,500	9,500
(Daily Average)	144	153	+ 5.6	121	— 20.8	117	138	125	104
CHANGE IN STOCKS:									
All Oils	**—2,852**	**—18,805**	.....	**+16,000**	.....	**—12,000**	**+34,000**	**+14,000**	**—20,000**
(Daily Average)	—8	—52	.....	+44	.....	—133	+374	+153	—218
Crude Oil	—3,271	—5,542	.....	.....	.....	.....	.....	.....	.....
(Daily Average)	—9	—15	.....	.....	.....	.....	.....	.....	.....
Natural Gasoline	+1,252	+1,369	.....	.....	.....	.....	.....	.....	.....
(Daily Average)	+3	+4	.....	.....	.....	.....	.....	.....	.....
Refined Products	—833	—14,632	.....	+16,000	.....	—12,000	+34,000	+14,000	—20,000
(Daily Average)	—2	+40	.....	+44	.....	—133	+374	+153	—218
NEW SUPPLY:									
Total New Supply	**2,230,830**	**2,462,905**	**+ 10.4**	**2,630,000**	**+ 6.8**	**645,000**	**652,000**	**662,000**	**671,000**
(Daily Average)	6,111	6,747	+ 10.4	7,205	+ 6.8	7,167	7,165	7,196	7,293
Domestic Production, Total	**1,996,699**	**2,153,896**	**+ 7.9**	**2,289,000**	**+ 6.3**	**562,000**	**569,000**	**577,000**	**581,000**
(Daily Average)	5,470	5,901	+ 7.9	6,271	+ 6.3	6,244	6,253	6,272	6,315
Crude Oil	1,840,307	1,972,812	+ 7.2	2,092,000	+ 6.0	513,500	521,500	527,500	529,500
(Daily Average)	5,042	5,405	+ 7.2	5,732	+ 6.0	5,706	5,731	5,734	5,755
Other Oils	156,392	181,084	+ 15.8	197,000	+ 8.8	48,500	47,500	49,500	51,500
(Daily Average)	428	496	+ 15.8	540	+ 8.8	539	522	538	560
Imports, Total	**234,131**	**309,009**	**+ 32.0**	**341,000**	**+ 10.4**	**83,000**	**83,000**	**85,000**	**90,000**
(Daily Average)	641	846	+ 32.0	934	+ 10.4	922	912	924	978
Crude Oil	154,922	176,698	+ 14.1	203,000	+ 14.9	48,000	50,000	52,000	53,000
(Daily Average)	424	484	+ 14.1	556	+ 14.9	533	549	565	576
Refined Products	79,209	132,311	+ 67.0	138,000	+ 4.3	35,000	33,000	33,000	37,000
(Daily Average)	217	362	+ 67.0	378	+ 4.3	389	363	359	402
Crude Oil Runs to Stills, Total	**1,945,519**	**2,093,167**	**+ 7.6**	**2,244,000**	**+ 7.2**	**549,000**	**558,000**	**566,000**	**571,000**
(Daily Average)	5,330	5,735	+ 7.6	6,148	+ 7.2	6,100	6,130	6,150	6,210
Demand for Domestic Crude, Total	**1,843,578**	**1,978,354**	**+ 7.3**	**2,092,000**	**+ 13.5**	**513,500**	**521,500**	**527,500**	**529,500**
(Daily Average)	5,051	5,420	+ 7.3	5,732	+ 13.5	5,706	5,731	5,734	5,755

* Includes liquefied gases, petroleum coke, asphalt, road oil, etc., and refinery losses.

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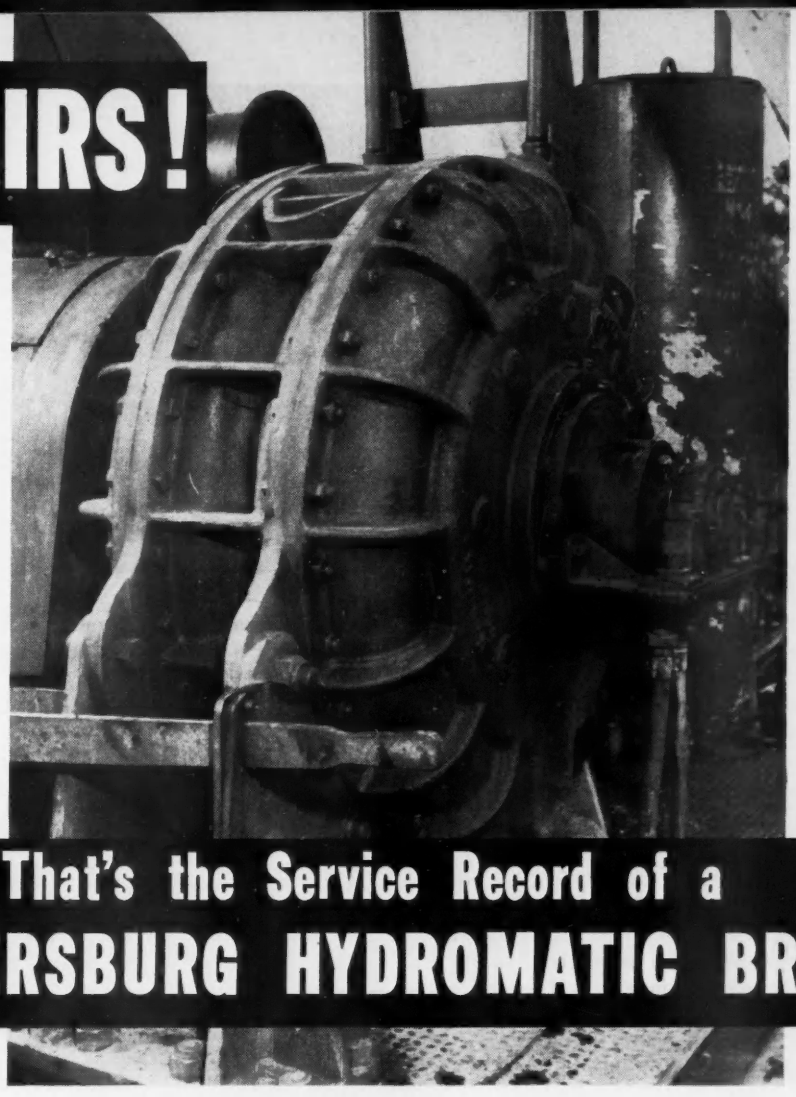

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000 barrels daily, set in 1948, by 186,000 barrels daily or 3.4 percent.

Total demand for all oils will average 7,162,000 barrels per day in 1951, as forecast by the government. This would be an all-time high and 371,000 barrels per day or 5.3 percent more than the demand of 6,791,000 barrels per day in 1950. The 1950 demand itself had set a new record, having been 672,000 barrels daily or 11.1 percent above the 6,119,000 daily of 1949. In 1949, demand was slightly less than in 1948.

Domestic Use to Rise

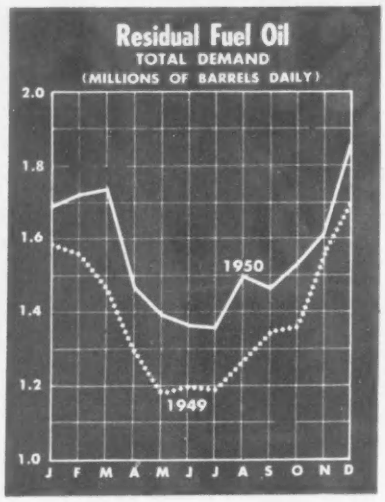
Greater total demand for all oils in 1951 will be due to higher domestic use, as exports are expected to continue decreasing. Domestic demand for all oils will average 6,923,000 barrels daily in 1951, it is anticipated. This would be an increase of 420,000 barrels per day or 6.5 percent over the 1950 demand of 6,503,000 barrels daily. The domestic requirements of 1950 were the highest so far on record, having exceeded 1949 needs by the extraordinary amount of 711,000 barrels daily or 12.3 percent.

For 1951 exports are expected to continue declining, as they have been doing steadily for several years. Total exports are forecast at 238,000 barrels daily, a decrease of 58,000 barrels daily or 19.4 percent from the 296,000 daily of 1950. In 1949 total exports had averaged 327,000 barrels per day.

Domestic demand for petroleum, as well as export demand, has been following irregular trends due to postwar readjustments and various abnormal conditions, and it is the prospect of further unusual conditions that makes forecasts of 1951 needs difficult and subject to future revision. The sharp increase in demand for 1950 has been described as really a two-year increase within one year, as the normal growth in oil use which should have occurred in 1949 did not occur, because of the business letdown in that year, while 1950 showed what was the equivalent of about two years' normal increase, with domestic use up 12.3 percent over 1949. As here forecast at 6,923,000 barrels daily in 1951, domestic demand would show about a normal increase of 6.5 percent over 1950.

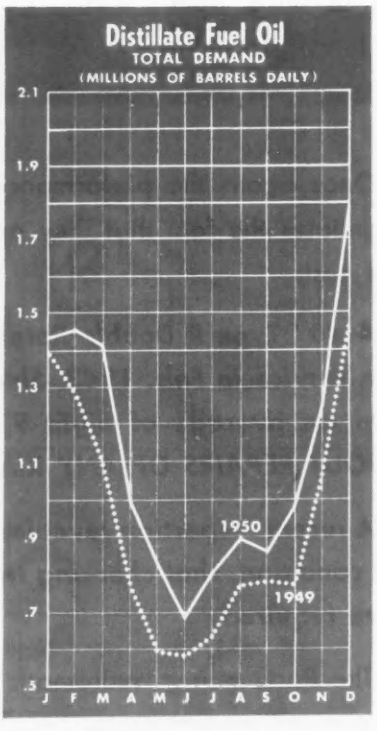
Figures here on domestic demand include deliveries to the armed forces in Continental United States. It has been estimated that greater military requirements may have increased total domestic demand in the last half of 1950 by about 2 percent. Similarly, the anticipated gain of about 6.5 percent in domestic demand in 1951 would include an increase of somewhat over 4 percent in civilian consumption and a further rise of over 2 percent in military needs.

(See Table on Page 50)



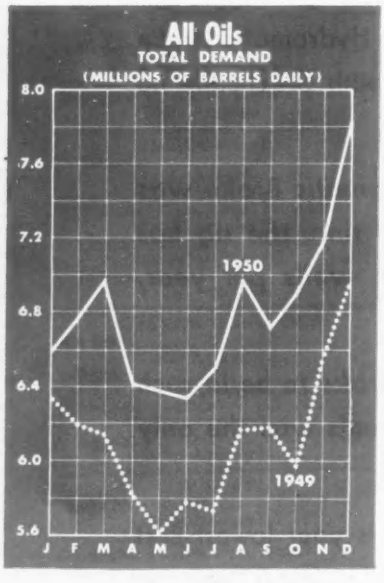
Barrels Daily Demand, Residual Fuel

MONTH	1950	1949
January	1,694,000	1,585,000
February	1,724,000	1,568,000
March	1,732,000	1,469,000
April	1,470,000	1,299,000
May	1,394,000	1,183,000
June	1,363,000	1,198,000
July	1,356,000	1,189,000
August	1,497,000	1,261,000
September	1,462,000	1,346,000
October	1,526,000	1,365,000
November	1,617,000	1,553,000
December	1,859,000	1,696,000



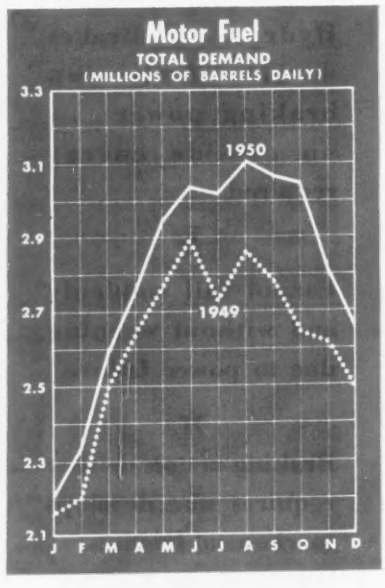
Barrels Daily Demand, Distillate Fuel

MONTH	1950	1949
January	1,428,000	1,392,000
February	1,453,000	1,291,000
March	1,411,000	1,102,000
April	994,000	777,000
May	838,000	595,000
June	687,000	579,000
July	806,000	628,000
August	895,000	770,000
September	864,000	777,000
October	989,000	773,000
November	1,243,000	1,055,000
December	1,787,000	1,461,000



Barrels Daily Demand, All Oils

MONTH	1950	1949
January	6,594,000	6,339,000
February	6,767,000	6,199,000
March	6,984,000	6,141,000
April	6,403,000	5,822,000
May	6,382,000	5,612,000
June	6,334,000	5,778,000
July	6,500,000	5,737,000
August	6,959,000	6,163,000
September	6,718,000	6,170,000
October	6,917,000	5,979,000
November	7,196,000	6,536,000
December	7,814,000	6,950,000

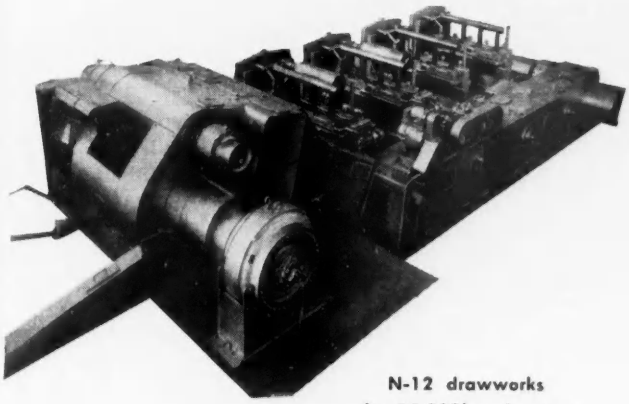


Barrels Daily Demand, Motor Fuel

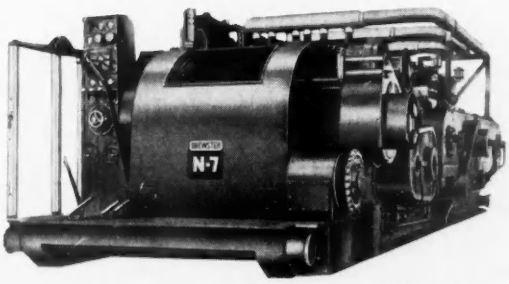
MONTH	1950	1949
January	2,210,000	2,164,000
February	2,331,000	2,200,000
March	2,595,000	2,495,000
April	2,757,000	2,637,000
May	2,944,000	2,769,000
June	3,069,000	2,896,000
July	3,023,000	2,726,000
August	3,101,000	2,860,000
September	2,971,000	2,779,000
October	2,948,000	2,649,000
November	2,804,000	2,618,000
December	2,665,000	2,497,000

BREWSTER *Matched* DRILLING TEAMS

CHEAP DRILLING AT ANY DEPTH



N-12 drawworks
for 15,000′ and more.



N-7 drawworks
for 8500′ drilling.

You get low cost hole to any drilling depth with Brewster matched drilling teams. They're fast . . . they're tough . . . they're balanced . . . they give you the most hole for your dollar.

Brewster rigs have made a lot of hole in the past forty years . . . millions of feet of hole, from Snyder to Leduc . . . and drillers will tell you that Brewster rigs are cheap at any depth.

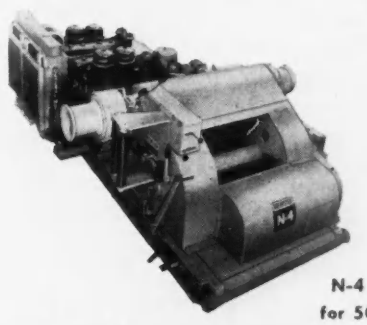
THE BREWSTER CO., SHREVEPORT, LA.

For each Brewster drawworks there is a matched team of rotary, swivel and block.

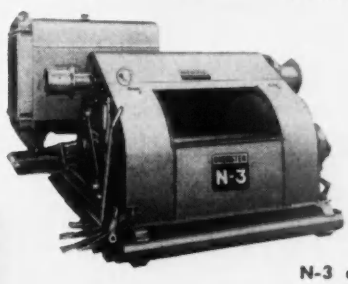
Matched design gives you fast rigging-up, balanced performance and quick one-call service.

At any depth, for cheap drilling, use Brewster matched drilling teams.

Ask your supply house for information.



N-4 drawworks
for 5000′ drilling.



N-3 drawworks
for 3500′ drilling.

Apex Equipment Co.
Bovaird Supply Co.
Industrial Supply Co.
Murray Brooks, Inc.
Reams Supply Co.
In Canada: Rocky Mountain Supply Co.
Export Sales: Direct and through recognized export dealers.

BREWSTER MATCHED *Drilling Equipment*

SINCE 1910—*Manufacturers of Fine Drilling Equipment*

Demand for and Supply of All Oils, Crude Oil, Motor Fuel, Kerosine, Fuel Oil and Lubricants

Sources: U. S. Bureau of Mines except November and December, 1950, estimated with aid of A.P.I. reports.

(THOUSANDS OF BARRELS)

ITEM	Year 1949	Year 1950	Percent Change
ALL OILS			
Domestic Production, Total	1,996,699	2,153,896	+ 7.9
(Daily Average)	5,470	5,901	+ 7.9
Crude Petroleum	1,840,307	1,972,812	+ 7.2
(Daily Average)	5,042	5,405	+ 7.2
Natural Gasoline	156,203	180,922	+ 15.8
(Daily Average)	428	496	+ 15.8
Benzol	189	162	— 14.3
(Daily Average)	.....	.....	.....
Imports, Total	234,131	309,009	+ 32.0
(Daily Average)	641	846	+ 32.0
Crude Petroleum	154,922	176,698	+ 14.1
(Daily Average)	424	484	+ 14.1
Refined Products	79,209	132,311	+ 67.0
(Daily Average)	217	362	+ 67.0
Changes in Stocks, All Oils	—2,852	—18,805	.....
(Daily Average)	—8	—52	.....
Stocks, Beginning of Period	605,743	603,119	— 0.4
Crude Petroleum	256,627	253,356	— 1.3
Refined Products	343,537	342,932	— 0.2
Natural Gasoline	5,579	6,831	+ 22.4
Stocks, End of Period	602,891	584,314	— 3.1
(Days' Supply)	99	86	— 13.1
Crude Petroleum	253,356	247,814	— 2.2
Refined Products	342,704	328,300	— 4.2
Natural Gasoline	6,831	8,200	+ 20.0
Demand, Total	2,233,682	2,481,710	+ 11.1
(Daily Average)	6,119	6,799	+ 11.1
Exports, Total	119,475	108,006	— 9.6
(Daily Average)	327	296	— 9.6
Crude Petroleum, Total	33,069	35,031	+ 5.9
(Daily Average)	90	96	+ 5.9
Refined Products, Total	86,406	72,975	— 15.6
(Daily Average)	237	200	— 15.6
Domestic Demand, Total	2,114,207	2,373,704	+ 12.3
(Daily Average)	5,792	6,503	+ 12.3
CRUDE PETROLEUM			
Supply:			
Domestic Production, Total	1,840,307	1,972,812	+ 7.2
(Daily Average)	5,042	5,405	+ 7.2
Imports, Total	154,922	176,698	+ 14.1
(Daily Average)	424	484	+ 14.1
Change in Stocks	—3,271	—5,542	.....
(Daily Average)	—9	—15	.....
Stocks, Beginning of Period	256,627	253,356	— 1.3
Stocks, End of Period	253,356	247,814	— 2.2
(Days' Supply)	46	42	— 8.7
Supply, Total	1,998,500	2,155,052	+ 7.8
(Daily Average)	5,475	5,904	+ 7.8
Demand:			
Runs to Stills, Total	1,945,519	2,093,167	+ 7.6
(Daily Average)	5,330	5,735	+ 7.6
Domestic Crude	1,789,842	1,915,638	+ 7.0
(Daily Average)	4,904	5,248	+ 7.0
Foreign Crude	155,677	177,529	+ 14.0
(Daily Average)	426	486	+ 14.0
Exports, Total	33,069	35,031	+ 5.9
(Daily Average)	90	96	+ 5.9
Transfers to Fuel Oil Stocks	7,451	7,894	+ 5.9
(Daily Average)	21	22	+ 5.9
Distillate Fuel Oil	2,701	2,474	— 8.4
Residual Fuel Oil	4,750	5,420	+ 14.1
Used as Fuel, and Losses	12,461	18,960	+ 52.2
(Daily Average)	34	52	+ 52.2
Demand, Total	1,998,500	2,155,052	+ 7.8
(Daily Average)	5,475	5,904	+ 7.8
KEROSINE			
Production, Total	102,152	118,138	+ 15.6
(Daily Average)	280	324	+ 15.6
Percent Yield from Crude	5.2	5.6	.....
Imports, Total	.....	249	.....
(Daily Average)	.....	1	.....
Change in Stocks	—3,053	—671	.....
(Daily Average)	—8	—2	.....
Stocks, Beginning of Period	23,941	20,888	— 12.8
Stocks, End of Period	20,888	20,217	— 3.2
(Days' Supply)	73	62	— 15.1
Demand, Total	104,684	119,058	+ 13.7
(Daily Average)	287	326	+ 13.7
Exports, Total	2,532	1,955	— 22.8
(Daily Average)	7	5	— 22.8
Domestic Demand	102,152	117,103	+ 14.6
(Daily Average)	280	321	+ 14.6

ITEM	Year 1949	Year 1950	Percent Change
MOTOR FUEL			
Production, Total	961,791	1,024,032	+ 6.5
(Daily Average)	2,635	2,806	+ 6.5
Refinery Gasoline, Total	853,594	902,496	+ 5.7
(Daily Average)	2,339	2,473	+ 5.7
Percent Yield from Crude	43.6	43.1	.....
Natural Gasoline, etc	156,203	180,922	+ 15.8
(Daily Average)	428	496	+ 15.8
Less Sales L.P.G.; Transfers Cycle Prods	48,195	59,548	+ 23.6
Benzol	189	162	— 14.3
Imports, Total	.....	150	.....
(Daily Average)	.....	.....	.....
Change in Stocks	+9,357	+6,836	.....
(Daily Average)	+26	+19	.....
Stocks, Beginning of Period	101,060	110,417	+ 9.2
Finished Gasoline	95,481	103,586	+ 8.4
Natural Gasoline	5,579	6,831	+ 22.4
Stocks, End of Period	110,417	117,253	+ 6.2
(Days' Supply)	42	42	.....
Finished Gasoline	103,586	109,053	+ 5.3
Natural Gasoline	6,831	8,200	+ 20.0
Demand, Total	952,434	1,017,346	+ 6.8
(Daily Average)	2,609	2,787	+ 6.8
Exports, Total	39,479	22,846	— 42.1
(Daily Average)	108	62	— 42.1
Domestic Demand	912,955	994,500	+ 8.9
(Daily Average)	2,501	2,725	+ 8.9
DISTILLATE FUEL OIL			
Production, Total	339,530	397,706	+ 17.1
(Daily Average)	930	1,090	+ 17.1
Percent Yield from Crude	17.4	19.0	.....
Transfers from Crude	2,701	2,474	— 8.4
(Daily Average)	7	7	— 8.4
Imports, Total	1,720	2,393	+ 39.1
(Daily Average)	5	7	+ 39.1
Change in Stocks	+3,778	— 4,560	.....
(Daily Average)	+10	—12	.....
Stocks, Beginning of Period	71,429	75,435	+ 5.6
Stocks, End of Period	75,207	70,875	— 5.8
(Days' Supply)	80	64	— 20.0
Demand, Total	340,219	407,133	+ 19.7
(Daily Average)	932	1,115	+ 19.7
Exports, Total	12,189	12,310	+ 1.0
(Daily Average)	33	34	+ 1.0
Domestic Demand	328,030	394,823	+ 20.4
(Daily Average)	899	1,081	+ 20.4
RESIDUAL FUEL OIL			
Production, Total	424,829	423,768	— 0.3
(Daily Average)	1,164	1,161	— 0.3
Percent Yield from Crude	21.7	20.2	.....
Transfers from Crude	4,750	5,420	+ 14.1
(Daily Average)	13	15	+ 14.1
Imports, Total	74,555	120,044	+ 61.0
(Daily Average)	204	329	+ 61.0
Change in Stocks	—3,828	—19,009	.....
(Daily Average)	—10	—52	.....
Stocks, Beginning of Period	64,021	60,193	— 6.0
Stocks, End of Period	60,193	41,184	— 31.6
(Days' Supply)	44	26	— 40.9
Demand, Total	507,962	568,241	+ 11.9
(Daily Average)	1,392	1,557	+ 11.9
Exports, Total	12,641	15,320	+ 21.2
(Daily Average)	35	42	+ 21.2
Domestic Demand	495,321	552,921	+ 11.6
(Daily Average)	1,357	1,515	+ 11.6
LUBRICANTS			
Production, Total	45,389	51,431	+ 13.3
(Daily Average)	124	141	+ 13.3
Percent Yield from Crude	2.3	2.5	.....
Imports, Total	.....	.....	.....
(Daily Average)	.....	.....	.....
Change in Stocks	—624	—2,119	.....
(Daily Average)	—2	—6	.....
Stocks, Beginning of Period	9,843	9,219	— 6.3
Stocks, End of Period	9,219	7,100	— 23.0
(Days' Supply)	73	48	— 34.2
Demand, Total	46,013	53,550	+ 16.4
(Daily Average)	126	147	+ 16.4
Exports, Total	13,005	13,927	+ 7.1
(Daily Average)	36	38	+ 7.1
Domestic Demand	33,008	39,623	+ 20.0
(Daily Average)	90	109	+ 20.0

To Be in Sharp Contrast

By ROBERT E. SPANN
Eastern District Editor

IMPORTS of crude oil and refined petroleum products into the U. S. reached a new high in 1950, and indications point to other countries capturing an even larger share of that nation's market in the current year. Along with the steadily rising imports, shipments of petroleum from the U. S. to world markets continued to decline last year, reaching the lowest level since 1933.

Total imports last year, averaging 846,600 barrels daily, exceeded exports by 550,700 barrels a day. This compared with a net difference of 314,100 barrels daily in 1949 and an import balance of only 146,600 barrels a day in the previous year. A much sharper contrast is predicted for 1951. Total imports are expected to reach a peak daily average of 934,200 barrels, more than double the rate of 1947, and resulting in a net difference of 695,900 barrels a day above anticipated exports. U. S. petroleum shipments to other countries this year are expected to decline by 57,600 barrels a day from 1950 and at that level will be the smallest since 1922.

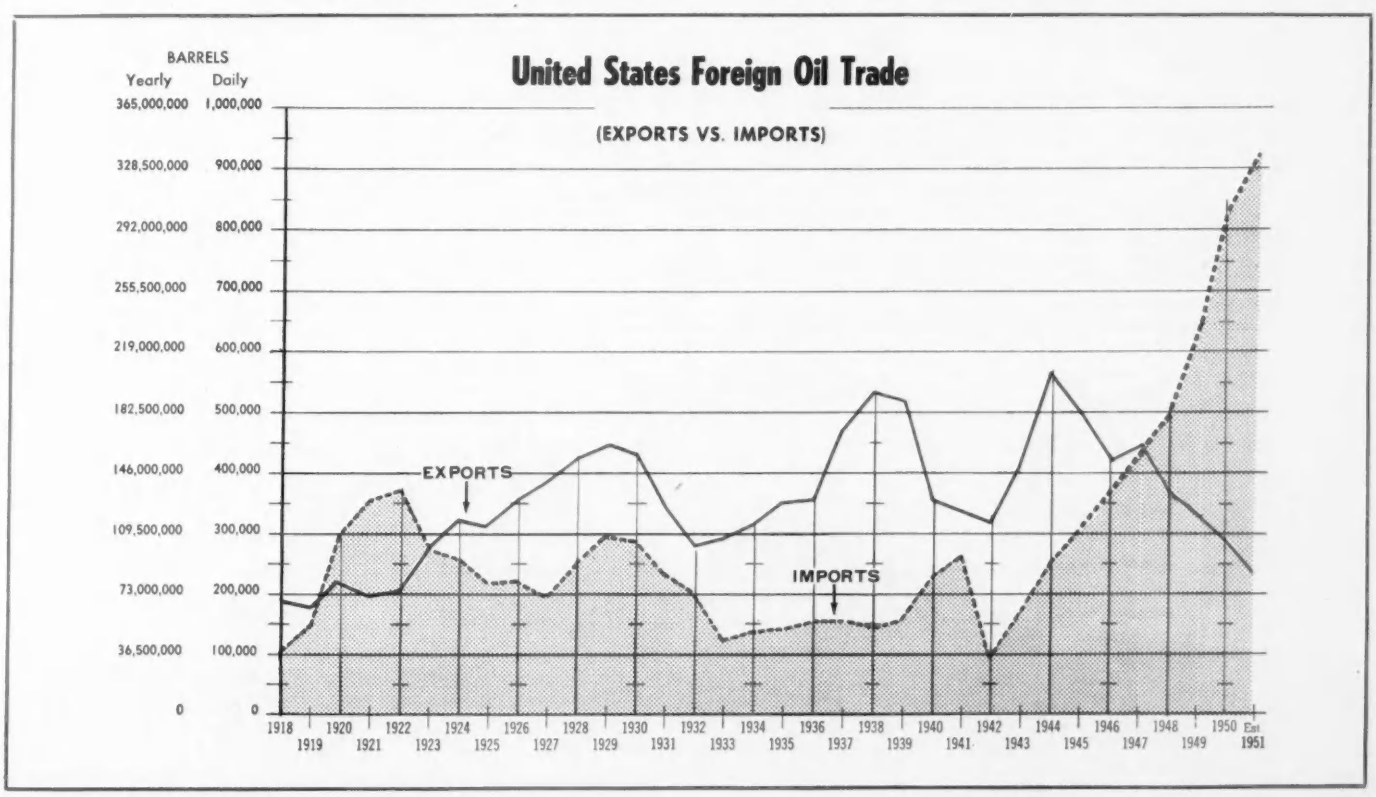
While these estimates of the foreign oil trade are made with the current uncertain international situation in mind, the possibility of a larger-scale war could endanger ocean supply lines to the extent that shipments of oil to the U. S. would be curtailed. While movement of petroleum to overseas military bases obviously would be stepped up sharply, this type of consumption is considered domestic rather than exported oil. Total imports of petroleum to the U. S. in 1942, the first full year of its participation in World War II, dropped to 98,500 barrels daily from a daily average of 266,700 barrels in the preceding year. The volume of foreign oil getting to U. S. shores in subsequent years of the last war increased steadily as the submarine menace diminished.

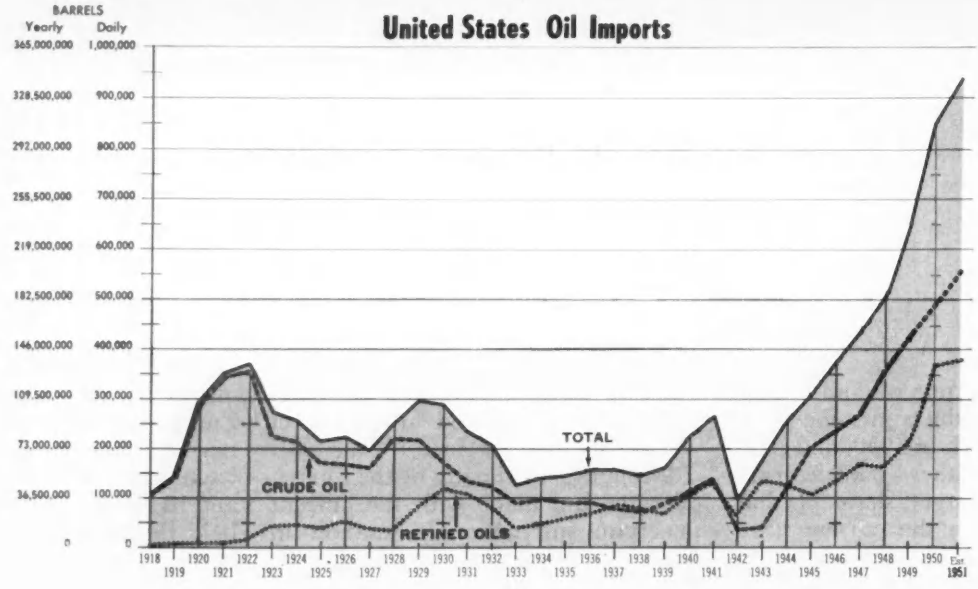
A war year, 1944, saw U. S. exports of petroleum reach a peak of 567,200 barrels daily. This was before crude oil production in the Middle East—Europe's nearest major source—reached importance in world petroleum markets. As long as the U. S. and its friendly European nations can hold the Middle Eastern oil fields in event of an allout war, it can be expected that oil for the European nations would come largely from that source.

Crude imports in 1950 accounted for 484,100 barrels a day of the total, up 59,900 barrels daily over 1949 and more than twice the volume of crude brought into the U. S. in 1945.

Total imports of refined products last year were 362,500 barrels daily, an increase of 145,500 barrels over 1949.

Exports in the current year are estimated to run about 238,300 barrels daily, consisting mostly of refined products, which has always been the trend. Finished oils shipped from the U. S. are expected to amount to 167,100 barrels daily.

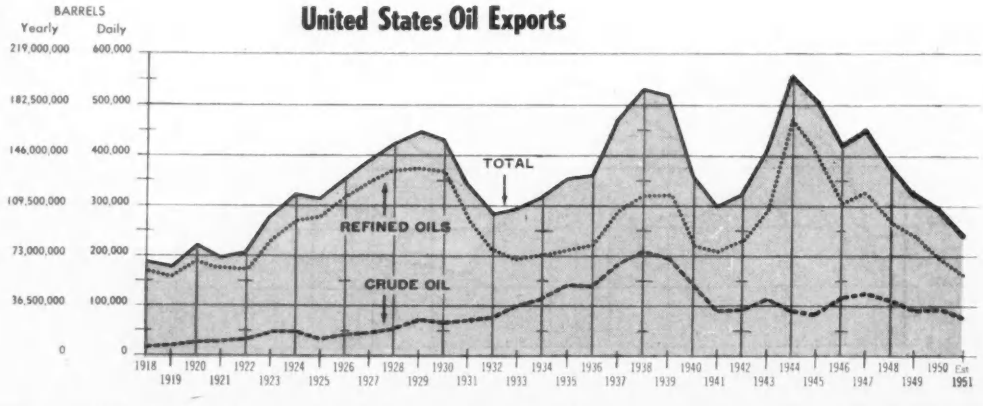


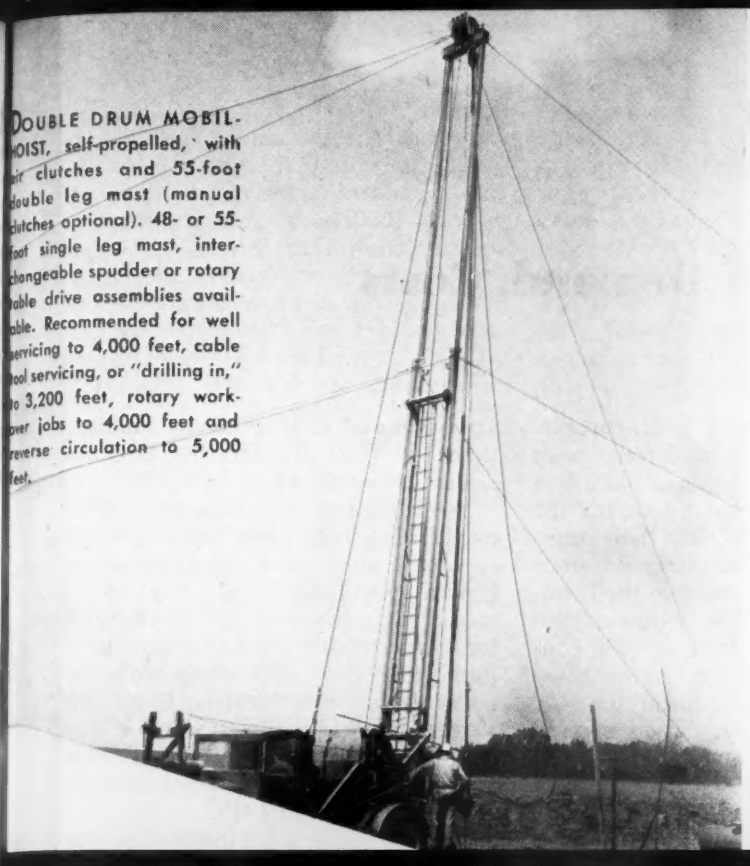


(All Figures in Barrels)

YEAR	IMPORTS						EXPORTS					
	CRUDE OIL		REFINED PRODUCTS		TOTAL IMPORTS		CRUDE OIL		REFINED PRODUCTS		TOTAL EXPORTS	
	Annual Total	Daily Average	Annual Total	Daily Average	Annual Total	Daily Average	Annual Total	Daily Average	Annual Total	Daily Average	Annual Total	Daily Average
1918	37,736,000	103,400	1,227,000	3,400	38,963,000	106,800	5,884,000	16,100	62,234,000	170,500	68,118,000	186,600
1919	52,822,000	144,700	1,376,000	3,800	54,198,000	148,500	6,348,000	17,400	57,545,000	157,600	63,893,000	175,100
1920	106,175,000	290,100	2,647,000	7,200	108,822,000	297,300	9,295,000	25,400	70,323,000	192,100	79,618,000	217,500
1921	125,364,000	343,500	3,428,000	9,400	128,792,000	352,900	9,527,000	26,400	62,254,000	170,500	71,881,000	196,900
1922	130,255,000	356,800	5,719,000	15,700	135,974,000	372,500	10,805,000	29,600	63,745,000	174,600	74,550,000	204,200
1923	82,015,000	224,700	17,638,000	48,300	99,653,000	273,000	17,534,000	48,000	84,800,000	232,300	102,334,000	280,300
1924	77,775,000	212,500	16,806,000	45,900	94,581,000	258,400	18,239,000	49,800	99,089,000	270,700	117,328,000	320,500
1925	61,824,000	169,400	16,376,000	44,900	78,200,000	214,300	13,337,000	36,500	100,684,000	275,900	114,021,000	312,400
1926	60,382,000	165,400	20,938,000	57,400	81,320,000	222,800	15,407,000	42,200	116,999,000	320,600	132,406,000	362,800
1927	58,383,000	159,900	13,353,000	36,600	71,736,000	196,500	15,844,000	43,400	126,419,000	346,400	142,263,000	389,800
1928	79,767,000	218,000	11,790,000	32,200	91,557,000	250,200	18,966,000	51,800	135,991,000	371,600	154,957,000	423,400
1929	78,933,000	216,200	29,777,000	81,600	108,710,000	297,800	26,401,000	72,300	136,719,000	374,600	163,120,000	446,900
1930	62,129,000	170,200	43,489,000	119,200	105,618,000	289,400	23,705,000	64,900	132,790,000	363,800	156,495,000	428,700
1931	47,250,000	129,500	38,837,000	106,400	86,087,000	235,900	25,535,000	70,000	98,819,000	270,700	124,354,000	340,700
1932	44,682,000	122,100	29,812,000	81,400	74,494,000	203,500	27,393,000	74,900	75,882,000	207,300	103,275,000	282,200
1933	31,893,000	87,400	13,501,000	37,000	45,394,000	124,400	36,584,000	100,200	70,143,000	192,200	106,727,000	292,400
1934	35,558,000	97,400	14,936,000	40,900	50,494,000	138,300	41,127,000	112,700	73,380,000	201,000	114,507,000	313,700
1935	32,239,000	88,300	20,396,000	55,900	52,635,000	144,200	51,430,000	140,900	77,557,000	212,500	128,987,000	353,400
1936	32,327,000	88,300	24,777,000	67,700	57,104,000	156,000	50,313,000	137,400	81,681,000	223,300	131,994,000	360,600
1937	27,484,000	75,300	29,673,000	81,300	57,157,000	156,600	67,234,000	184,200	105,600,000	289,300	172,834,000	473,500
1938	26,412,000	72,400	27,896,000	76,400	54,308,000	148,800	77,254,000	211,700	116,474,000	319,100	193,728,000	530,800
1939	33,095,000	90,700	25,965,000	71,100	59,060,000	161,800	72,076,000	197,500	116,883,000	320,200	188,959,000	517,700
1940	42,662,000	116,600	41,089,000	112,200	83,751,000	228,800	51,496,000	140,700	78,970,000	215,800	130,466,000	356,500
1941	50,606,000	138,700	46,536,000	127,500	97,142,000	266,200	33,238,000	91,100	75,592,000	207,100	108,830,000	298,200
1942	12,297,000	33,700	23,669,000	64,800	35,966,000	98,500	33,834,000	92,700	83,073,000	227,600	116,907,000	320,300
1943	13,833,000	37,900	49,579,000	135,800	63,412,000	173,700	41,342,000	113,200	108,615,000	297,600	149,957,000	410,800
1944	44,805,000	122,400	47,506,000	129,800	92,311,000	252,200	34,238,000	93,500	173,378,000	473,700	207,616,000	567,200
1945	74,337,000	203,600	39,282,000	107,600	113,619,000	311,200	32,998,000	90,400	149,985,000	410,900	182,983,000	501,300
1946	86,066,000	235,800	51,610,000	141,400	137,676,000	377,200	42,436,000	116,300	110,687,000	303,200	153,123,000	419,500
1947	97,532,000	267,200	61,857,000	169,500	159,389,000	436,700	46,355,000	127,000	118,122,000	323,600	164,477,000	450,600
1948	129,093,000	352,300	59,051,000	161,100	188,144,000	514,000	39,736,000	108,200	94,938,000	259,100	134,674,000	367,400
1949	154,922,000	424,200	79,209,000	217,000	234,131,000	641,200	33,069,000	90,200	86,406,000	236,300	119,475,000	327,100
1950	176,698,000	484,100	132,311,000	362,500	309,009,000	846,600	35,031,000	96,000	72,975,000	199,900	108,005,000	295,900
1951 Est.	203,000,000	556,100	138,000,000	378,100	341,000,000	934,200	26,000,000	71,200	61,000,000	167,100	87,000,000	238,300

Source: U. S. Bureau of Mines, except 1950 includes estimates for November and December.





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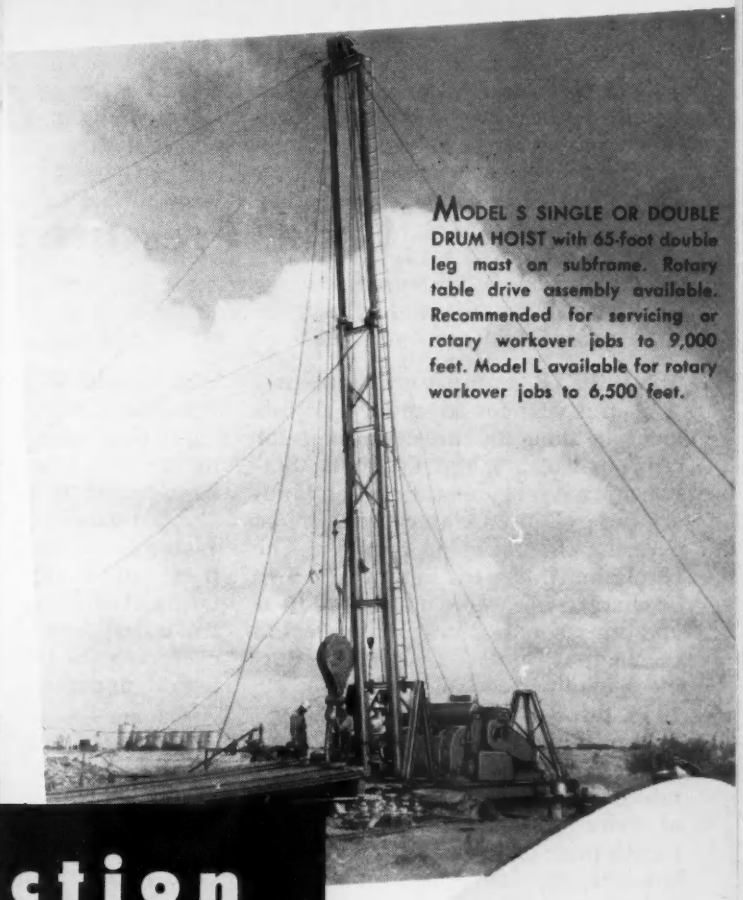

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Under Pressure of Demand, Costs

DESPITE strong pressure early this year for an upward adjustment in domestic price postings for crude petroleum, the Economic Stabilization Agency at the end of January ordered a mandatory price freeze covering the entire oil industry. The regulation limits maximum prices to be charged for crude, refined products and other commodities and services to the highest quotations in effect during a base period from December 19, 1950, through January 25, 1951.

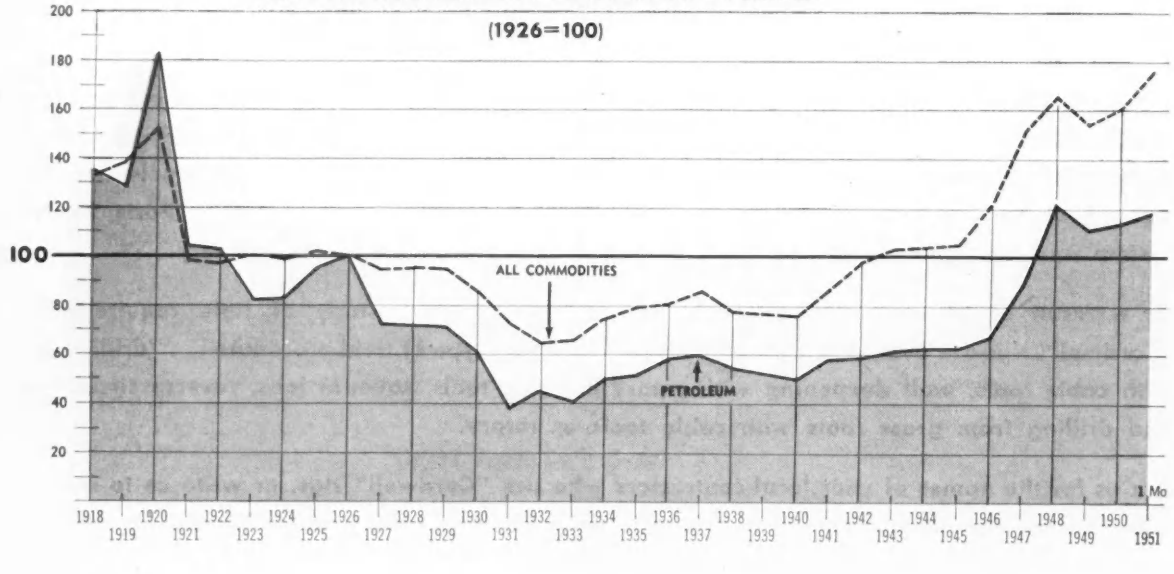
Any future price increases for petroleum can only come through permission or direction of the Director of Price Stabilization. The government's price control agency indicated, however, additional price ceiling regulations, some of which would be "tailored" to meet specific industry problems, would be issued if practicable. Petroleum importers, under the price regulation, are allowed to sell at prices higher than those charged during the base period if they can show their "landed costs" have increased since January 25 and provided their imports are covered by existing contracts. At the expiration of such contracts, importers cannot charge prices exceeding the highest during the base period under the regulation now in effect.

Under the general petroleum price freeze order, the national weighted average wellhead posting for crude oil is limited to no more than $2.58 a barrel, it is estimated by WORLD OIL. This estimated January average price of crude across the nation is 1 cent a barrel above the over-all average posting of 1950 and 3 cents higher than the 1949 average, but 2 cents under the wellhead price in 1948.

While the several orders of the ESA establishing maximum price ceilings on nearly all commodities came when general wholesale prices were at a record high, wholesale prices charged for all petroleum products were well under their peak. The wholesale price index of all commodities, based on 1926 as 100, in January stood at 177.8, up from the average of 161.3 of 1950 and above the previous postwar high of 165.1 reached in 1948.

The wholesale price index of petroleum products, however, in January was 118.2, a decline of 3.9 from the 1948 postwar peak, and considerably below the all-time high of 183.5 of 1920. By comparison, petroleum prices

Wholesale Price Indices
All Commodities Vs. Petroleum Products



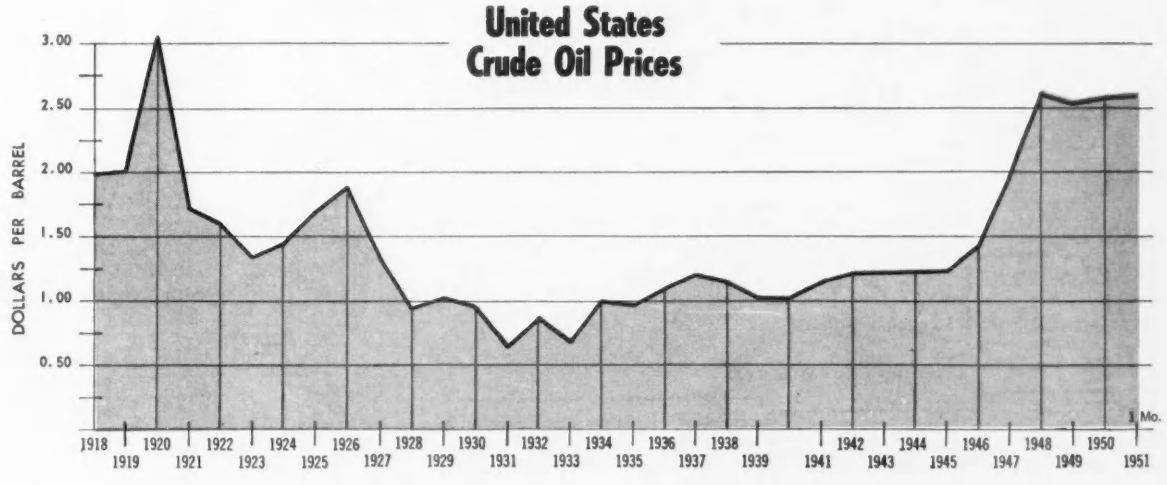
YEAR	All Commodities	Petroleum	YEAR	All Commodities	Petroleum	YEAR	All Commodities	Petroleum	YEAR	All Commodities	Petroleum	YEAR	All Commodities	Petroleum
1918	131.3	135.3	1925	103.5	95.0	1932	64.8	45.4	1939	77.1	52.2	1946	121.1	67.5
1919	138.6	128.0	1926	100.0	100.0	1933	65.9	41.0	1940	78.6	50.0	1947	152.1	90.2
1920	154.4	183.5	1927	95.4	72.7	1934	74.9	50.5	1941	87.3	57.0	1948	165.1	122.1
1921	97.6	104.4	1928	96.7	72.0	1935	80.0	51.3	1942	98.8	59.8	1949	154.9	112.2
1922	96.7	102.9	1929	95.3	71.3	1936	80.8	57.3	1943	103.1	62.5	1950	161.3	114.0
1923	100.6	82.6	1930	86.4	61.5	1937	86.3	60.5	1944	104.0	63.9	1951 (Jan)	177.8	118.2
1924	98.1	83.5	1931	73.0	39.5	1938	78.6	55.9	1945	105.8	63.5			

in 1920 were ahead of the average prices of all commodities, which stood at 154.4, adjusted to the 1926 base.

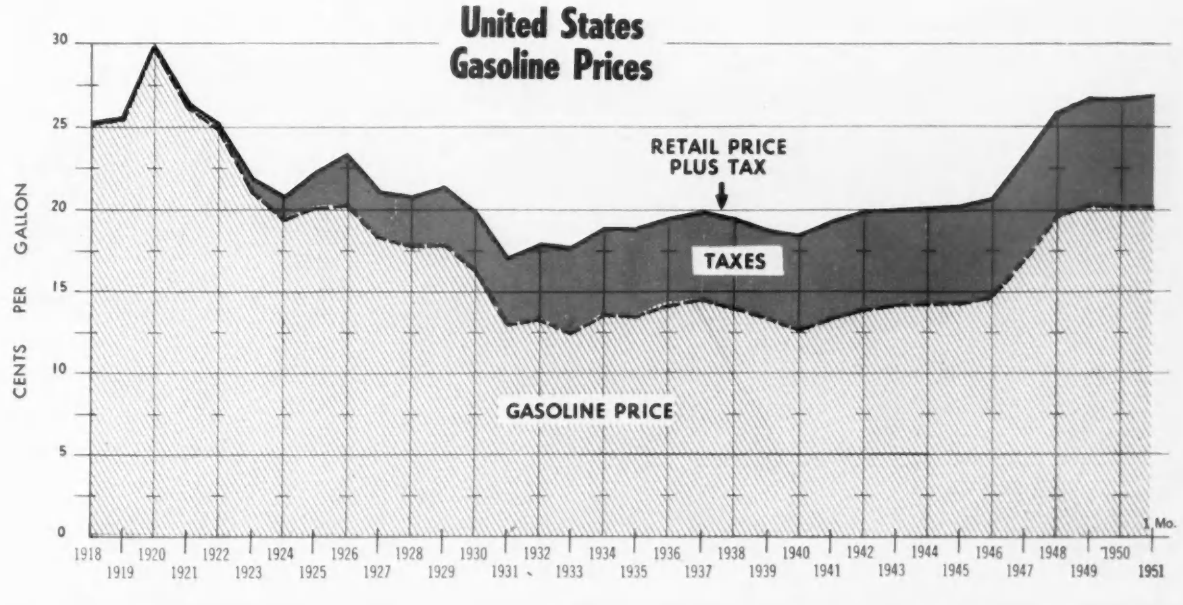
While the national average crude oil price posting in 1950 of $2.57 a barrel at the well was 2 cents a barrel above the average for 1949, it represented improvement in prices during the year, primarily for Pennsylvania grade crude and for heavy crudes in California. Postings for most other grades remained unchanged during 1950.

Prices of heavy crudes in California were drastically reduced in 1949 because of oversupply. But the cuts were partially canceled by increases in 1950, as more supplies of residual and heavy crude oils were required for military and industrial purposes. Lighter crudes also were cut slightly at mid-1949, with Long Beach 27-27.9 gravity lowered from $2.45 to $2.37 per barrel. That grade on December 12, 1950, was raised 4 cents to $2.41, and similar changes have applied to other gravities above 27 at Long Beach and also in other California fields.

Prices paid for Pennsylvania grade crude were increased several times in 1950, reversing the downward trend of 1949. The sixth and final increase



YEAR	CRUDE OIL DOLLARS PER BARREL	GASOLINE CENTS PER GALLON 50 Cities Average			YEAR	CRUDE OIL DOLLARS PER BARREL	GASOLINE CENTS PER GALLON 50 Cities Average			YEAR	CRUDE OIL DOLLARS PER BARREL	GASOLINE CENTS PER GALLON 50 Cities Average		
	At Wells	Without Tax	Tax	With Tax		At Wells	Without Tax	Tax	With Tax		At Wells	Without Tax	Tax	With Tax
1918	1.98	25.12	0.00	25.12	1931	.65	12.98	4.00	16.98	1942	1.19	13.96	5.97	19.93
1919	2.01	25.41	0.06	25.47	1932	.87	13.30	4.63	17.93	1943	1.20	14.12	5.97	20.09
1920	3.07	29.74	0.09	29.83	1933	.67	12.41	5.41	17.82	1944	1.21	14.19	5.97	20.16
1921	1.73	26.11	0.20	26.31	1934	1.00	13.64	5.21	18.85	1945	1.22	14.22	6.02	20.24
1922	1.61	24.82	0.38	25.20	1935	.97	13.55	5.29	18.84	1946	1.41	14.69	6.08	20.77
1923	1.34	21.06	0.91	21.97	1936	1.09	14.10	5.35	19.45	1947	1.93	16.93	6.18	23.11
1924	1.43	19.46	1.48	20.94	1937	1.18	14.59	5.40	19.99	1948	2.60	19.54	6.34	25.88
1925	1.68	20.09	2.11	22.20	1938	1.13	14.07	5.44	19.51	1949	2.55	20.27	6.52	26.79
1926	1.88	20.97	2.41	23.38	1939	1.02	13.31	5.44	18.75	1950	2.57	20.09	6.68	26.77
1927	1.30	18.29	2.80	21.09	1940	1.02	12.75	5.66	18.41	1951 (Jan.)	2.58	20.10	6.70	26.80
1928	1.17	17.90	3.04	20.94	1941	1.14	13.30	5.93	19.23					
1929	1.27	17.92	3.50	21.42										
1930	1.19	16.17	3.78	19.95										

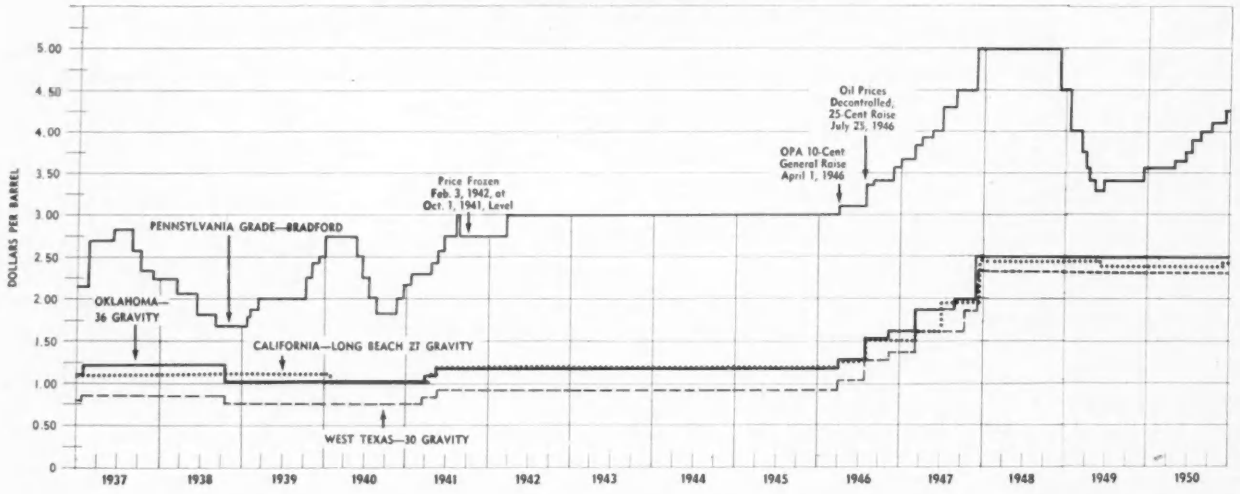


of 1950, a 15-cent raise December 9, put Bradford-Allegany crude at $4.25 per barrel. This compared with $3.54 at the beginning of 1950 and a post-war low of $3.27 posted May 11, 1949, but was well below the peak of $5 per barrel that prevailed in most of 1948.

With increased prices for steel and generally higher wages made in 1950 many producers can be expected in the near future to present their cases to the government price regulatory agency for some relief in the form of higher crude oil postings than now permitted. This may be particularly true of oil producers in the vast Mid-Continent area, where crude oil prices generally have been unchanged since December, 1947. The top price for Oklahoma-Kansas crude (40 gravity and above) at that time was set at $2.65 a barrel. An attempt to raise this posting to $3 a barrel in September, 1948, was defeated.

Aside from the recent rises in materials and labor costs, oil producers seeking permission for higher crude oil prices have a good argument in their favor in rapidly rising demand for petroleum, which may require increasing production above the current record level.

Prices of Principal U.S. Grades of Crude Oil



DATE	Pennsylvania Grade, Bradford	Oklahoma-Kansas 36–36.9° Gravity	California, Long Beach 27–27.9° Gravity	W. Texas (Sour) 30–30.9° Gravity
1937—				
Prior to January 1	$2.15	$1.10	$1.10	$0.78
January 28	....	1.22	....	0.88
February 24	2.67	....	....	....
June 7	2.82	....	....	....
September 1	2.60	....	....	....
October 12	2.35	....	....	....
December 1	2.20	....	....	....
1938—				
March 7	2.05	....	....	....
June 13	1.80	....	....	....
September 1	1.68	....	....	....
October 12	....	1.02	....	0.75
1939—				
January 21	1.80	....	....	....
February 1	1.88	....	....	....
March 6	2.00	....	....	....
October 6	2.25	....	....	....
November 1	2.40	....	....	....
December 1	2.50	....	....	....
1940—				
January 1	2.75	....	....	....
February 1	....	....	1.03	....
May 22	2.50	....	....	....
June 18	2.25	....	....	....
July 12	2.00	....	....	....
August 18	1.85	....	....	....
November 12	2.00	....	....	....
December 17	2.15	....	....	....
1941—				
January 27	2.30	....	....	....
March 29	....	....	....	0.82
April 1	....	1.07	....	....
April 23	2.40	....	....	....
April 24	....	....	1.09	....
May 20	2.55	1.17	....	....
May 21	....	....	....	0.92
May 23	....	....	1.15	....
June 18	2.75	....	....	....
August 14	2.98	....	....	....
August 23	2.75	....	....	....
October 1 (Prices later frozen at levels of this date)	2.75	1.17	1.15	0.92
1942—				
February 3 (Prices frozen by O.P.A. at October 1, 1941 level)	2.75	1.17	1.15	0.92
March 26 (O. P. A. granted Penn. Grade raise)	3.00	....	....	....

DATE	Pennsylvania Grade, Bradford	Oklahoma-Kansas 36–36.9° Gravity	California, Long Beach 27–27.9° Gravity	W. Texas (Sour) 30–30.9° Gravity
1943—(Prices frozen)	$3.00	$1.17	$1.15	$0.92
1944—(Prices frozen)	....	....	....	....
1945—(Prices frozen)	....	....	....	....
1946—				
April 1 (O.P.A. 10c Raise)	3.10	1.27	1.25	1.02
July 25 (Oil Prices Decontrolled)	....	1.52	....	1.27
August 1	3.35	....	1.50	....
September 1	3.41	....	....	....
November 15	....	1.62	....	....
November 19	....	....	....	1.37
December 9	3.55	....	....	....
1947—				
January 1	3.65	....	....	....
March 1	3.81	....	....	....
March 10	....	1.87	....	1.62
March 19	....	....	1.75	....
April 1	3.91	....	....	....
May 16	4.05	....	....	....
July 1	4.30	....	1.95	....
September 1	4.50	....	....	....
October 15	....	2.07	....	....
October 16	....	....	....	1.82
December 1	5.00	....	....	....
December 6	....	2.57	....	....
December 8	....	....	....	2.32
December 27	....	....	2.45	....
1948—				
December 11	4.50	....	....	....
1949—				
January 21	4.00	....	....	....
March 11	3.75	....	....	....
April 1	3.55	....	....	....
April 13	3.40	....	....	....
May 11	3.27	....	....	....
June 1	....	....	2.37	....
June 16	3.40	....	....	....
December 12	3.54	....	....	....
1950—				
May 1	3.65	....	....	....
June 21	3.75	....	....	....
July 19	3.89	....	....	....
August 25	4.00	....	....	....
October 9	4.10	....	....	....
December 9	4.25	....	....	....
December 12	....	....	2.41	....

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Stocks of Oils

Need Expansion

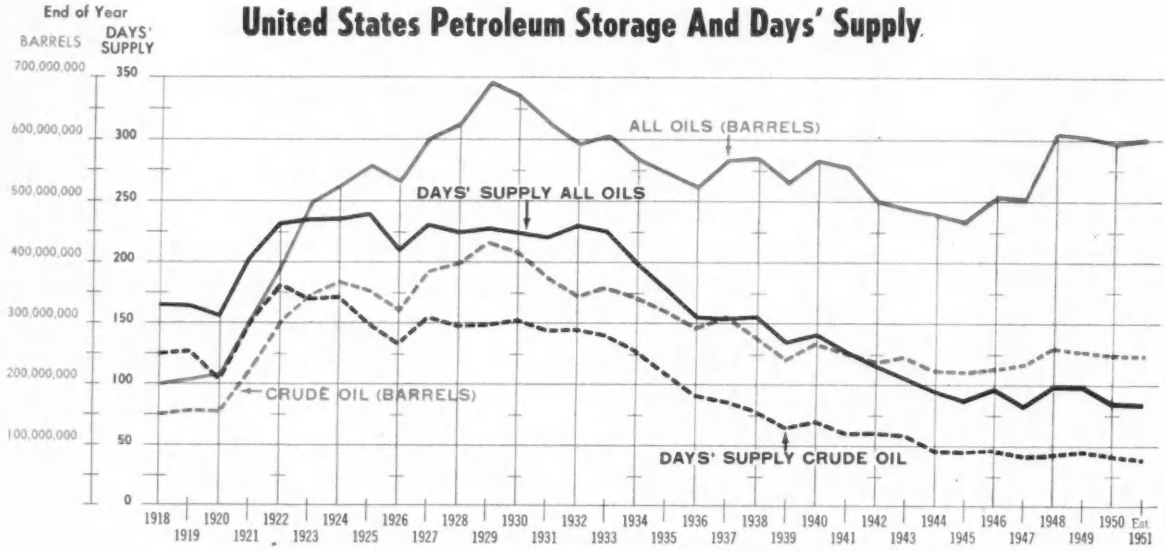
THE industry entered 1951 with stocks of crude petroleum and refined products at fairly satisfactory levels. But in view of prospective increases in demand for virtually all products, it is indicated that some buildups of product stocks for the year as a whole would be justified.

The U. S. Bureau of Mines, in estimating the requirements of domestic crude production in 1951, made no allowance for either increasing or reducing crude stocks during the year. However, it recognized the possibility that stocks of refined products might need to be expanded somewhat during the year and estimated that product stocks in the aggregate might be about 16 million barrels greater at the end of the year than at the beginning. A net increase in that amount would be equivalent to a daily average increase of 44,000 barrels in the product stocks. The increase for the year would be achieved by adding to stocks in the second and third quarters more than the withdrawals of the first and fourth quarters in meeting seasonal peak demand for heating oil. In the forecast it was estimated that changes in refined product stocks might involve a reduction of 12 million barrels (133,000 daily) in the first quarter, an increase of 34 million barrels (374,000 daily) in the second quarter, an increase of 14 million barrels (153,000 daily) in the third quarter, and a reduction of 20 million barrels (218,000 daily) in the fourth quarter.

Although the government report did not break down the estimates of possible net additions to refined product stocks in 1951, it is indicated that some addition might be justified especially for distillate fuel oil, while kerosine and residual fuel oil stocks possibly should also be expanded somewhat for the year. Lubricant stocks, too, are comparatively low, and additions might be desirable.

At the beginning of 1951, aggregate stocks of crude oil and refined products in the U. S. outside California were not materially changed from the beginning of 1950 but generally represented fewer days' supply because of increased demand. Gasoline stocks were moderately higher and were about unchanged in terms of days'

United States Petroleum Storage And Days' Supply



End of Year	ALL OILS Barrels	ALL OILS Day's Supply	CRUDE OIL Barrels Refinable	CRUDE OIL Days' Supply
1918	193,411,000	165	144,336,000	125
1919	200,383,000	164	149,356,000	127
1920	209,845,000	156	149,448,000	103
1921	294,428,000	203	217,324,000	150
1922	385,349,000	232	295,708,000	181
1923	492,088,000	235	340,637,000	169
1924	520,287,000	236	360,475,000	171
1925	552,464,000	239	345,863,000	150
1926	527,084,000	210	315,029,000	133
1927	597,176,000	231	379,660,000	155
1928	621,010,000	224	392,629,000	148
1929	689,166,000	228	428,445,000	149
1930	665,497,000	224	411,882,000	153
1931	621,673,000	221	370,194,000	144
1932	590,106,000	230	339,875,000	145
1933	602,198,000	226	354,223,000	140
1934	564,350,000	199	337,254,000	128
1935	541,700,000	178	314,855,000	109
1936	519,229,000	155	288,579,000	91
1937	564,728,000	154	305,833,000	87
1938	567,703,000	156	274,165,000	79
1939	525,838,000	135	238,910,000	66
1940	563,277,000	141	264,079,000	70
1941	552,328,000	127	247,499,000	61
1942	497,940,000	116	234,889,000	61
1943	485,698,000	106	243,506,000	59
1944	477,089,000	95	220,862,000	46
1945	463,579,000	87	218,763,000	45
1946	507,094,000	95	224,473,000	45
1947	502,053,000	85	224,929,000	42
1948	607,856,000	99	246,572,000	43
			All Crude	
*1948	605,743,000	99	256,627,000	44
1949	603,119,000	99	253,356,000	46
1950	584,314,000	86	247,814,000	42
1951 Est.	600,000,000	84	248,000,000	39

* Revised; new basis.

supply; and crude stocks, virtually unchanged, were equivalent to fewer days' supply; while there were reductions in volume as well as days' supply for kerosine, distillate fuel oil, and residual fuel oil. In California, 1950 brought reductions of stocks of crude oil and all major refined products, including a drastic cut in residual fuel oil inventories, in meeting the abnormal requirements imposed by the Korean War. These California withdrawals largely accounted for the fact that U. S. stocks of all oils were reduced during 1950 by 18,805,000 barrels, an average of 52,000 barrels daily. For the nation, crude stocks were lowered 5,542,000 barrels, or 15,000 barrels daily average; natural gasoline stocks were increased 1,369,000 barrels (4000 daily); and stocks of refined products were reduced 14,632,000 barrels (40,000 daily).

The above figures are on the basis of Bureau of Mines monthly petroleum statements and are from tables in the article on petroleum demand in this issue. The table herewith on stocks of crude by grade or origin, based on the bureau's weekly crude stocks reports, differs only slightly from the above figures and shows a reduction in California-grade crude stocks in 1950 by about 7 million barrels, with stocks for the rest of the country in the aggregate virtually unchanged, as increases for some grades offset reductions for other grades.

For the country as a whole, stocks of refined products were reduced during 1950, as previously noted, by 14,632,000 barrels. For the four major products there was for the U. S. a reduction of 18,463,000 barrels in stocks, involving declines of 19,009,000 barrels for residual fuel oil, 4,560,000 barrels of distillate fuel oil, and 671,000 barrels of kerosine, partly offset by an increase of 5,777,000 barrels in stocks of finished and unfinished gasoline. However, these national results reflected a decrease of 20,837,000 barrels in stocks of the four major products in California, which was partially offset by an increase of 2,374,000 barrels for the remainder of the country.

The large reduction of product stocks in California involved mostly residual fuel oil, stocks of which were drawn down 16,686,000 barrels, although there were also reductions of 2,081,000 barrels in distillate fuel oil stocks, 65,000 barrels in kerosine storage, and 2,005,000 barrels in the inventories of finished and unfinished gasoline.

The net increase of 2,374,000 barrels in aggregate stocks of the four major products outside California in 1950 was the result of increasing inventories of finished and unfinished gasoline by 7,782,000 barrels, while reducing stocks of kerosine 606,000 barrels, those of distillate fuel oil by 2,479,000 barrels, and residual fuel oil stocks by 2,323,000 barrels. The increase in gasoline stocks and the reductions in stocks of fuel oils and kerosine east of California were well distributed among the different refining districts, indicating no significant deficiency or surplus of any product in any of the districts.

Stocks of Crude Petroleum in U. S. by Grades, At End of December
(Based on Weekly Reports of U. S. Bureau of Mines)
(THOUSANDS OF BARRELS)

GRADE or ORIGIN	Dec. 27, 1941	Dec. 31, 1949	Dec. 30, 1950	Changes 1941-1950	Changes 1949-1950
Pennsylvania Grade	3,642	2,837	2,079	— 1,563	— 758
Other Appalachian	1,427	1,879	1,299	— 128	— 580
Lima-Michigan	1,360	892	674	— 686	— 218
Illinois-Indiana	18,201	11,197	9,145	— 9,056	— 2,052
Arkansas	2,708	3,005	2,608	— 100	— 397
Kansas	7,481	8,321	10,055	+ 2,574	+ 1,734
Louisiana	12,901	14,061	14,059	+ 1,158	— 2
Northern	4,078	3,362	2,638	— 1,440	— 724
Gulf Coast	8,823	10,699	11,421	+ 2,598	+ 150
Mississippi	2,290	2,254	2,424	+ 134	+ 170
New Mexico	6,862	7,622	6,985	+ 123	— 637
Oklahoma	51,582	29,752	29,114	—22,468	— 638
Texas	82,155	114,534	119,093	+36,938	+ 4,559
East Texas	20,287	15,978	14,845	— 5,442	— 1,133
West Texas	18,682	42,157	47,049	+28,367	+ 4,892
Gulf Coast	24,153	30,141	28,232	+ 4,079	— 1,909
Other Texas	19,033	26,258	28,967	+ 9,934	+ 2,709
Panhandle	.....	3,996	3,747	.....	— 249
North	.....	7,292	8,310	.....	+ 1,018
South	.....	6,854	7,240	.....	+ 386
Other	.....	8,116	9,670	.....	+ 1,554
Rocky Mountain	16,095	13,339	11,475	— 4,620	— 1,864
California	45,008	38,149	31,155	—13,853	— 6,994
Foreign	2,203	6,607	7,598	+ 5,395	+ 991
Total in U. S.	253,915	254,449	247,763	— 6,152	— 6,686

Stocks of Major Petroleum Products Held by Refining Companies in the United States at the End of December, 1950, Compared with 1941 and 1949

Stock at refineries, at bulk terminals, in transit, and in pipe lines. Data for 1941 and 1949 from Bureau of Mines monthly reports; for 1950 from weekly reports of American Petroleum Institute.

(THOUSANDS OF BARRELS)

DISTRICT	FINISHED AND UNFINISHED GASOLINE Stocks End of December			KEROSENE Stocks End of December			GASOIL AND DISTILLATE FUEL Stocks End of December			RESIDUAL FUEL OIL Stocks End of December		
	1941	1949	1950	1941	1949	1950	1941	1949	1950	1941	1949	1950
East Coast	21,183	23,059	24,503	2,489	9,252	8,314	18,631	24,008	21,394	10,041	10,777	9,619
Appalachian	3,684	3,914	4,073	311	448	495	704	1,012	809	578	456	516
District No. 1	.....	2,691	2,844	.....	324	342	.....	841	678	.....	349	366
District No. 2	.....	1,223	1,229	.....	124	153	.....	171	131	.....	107	150
Indiana, Illinois, Kentucky	18,327	22,797	24,963	1,168	4,109	4,492	5,552	10,511	10,167	4,152	3,625	3,570
Oklahoma, Kansas, Missouri	8,875	10,826	11,957	618	893	993	1,766	5,360	7,909	2,046	1,314	1,228
Inland Texas	3,288	3,553	3,764	282	450	431	301	899	999	1,349	856	634
Texas Gulf Coast	15,831	16,737	18,272	2,949	3,061	2,997	7,801	14,369	12,550	8,710	6,249	5,018
Louisiana Gulf Coast	3,303	6,568	7,471	513	1,207	1,141	1,798	4,178	3,653	2,217	2,139	2,330
Arkansas and Louisiana Inland	806	2,617	2,664	213	345	274	341	560	814	368	228	154
Rocky Mountains	1,809	3,479	3,665	129	291	313	319	1,557	1,680	535	558	810
District No. 3	.....	110	105	.....	24	25	.....	67	53	.....	30	32
District No. 4	.....	3,369	3,560	.....	267	288	.....	1,490	1,627	.....	528	778
California	16,992	17,893	15,888	927	832	767	12,713	12,981	10,900	53,199	33,991	17,305
Total United States	94,089	111,443	117,220	9,599	20,888	20,217	49,926	75,435	70,875	83,195	60,193	41,184

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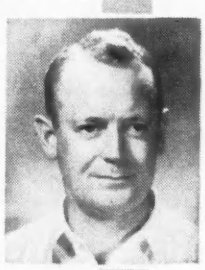

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LEGISLATIVE OUTLOOK

Poses Problems for Oil Industry

By L. DAN JONES
Attorney, Independent Petroleum Association of America

THE oil industry is confronted with a number of problems which normally would be expected to receive the attention of Congress during the two-year term of the 82d Congress. The times, however, are not normal and perhaps our economic and political activities will not revert to normalcy during the life of the new Congress. The attention of Congress, like that of the nation, will be absorbed by the day-to-day international emergencies that appear to be in store in fulfilling a gigantic military preparedness program.

Under such circumstances the normal legislative problems peculiar to the oil industry, like those of all other individual industries, take a secondary position of priority. Many of them may be delayed. Not only will Congress be short of time, but the energies of all will be diverted from non-essential activity to the tasks relating to the preparedness effort.

All concerned, those in industry and also those in government, have the responsibility of conducting their course of action in such a way that our full energies will be free to make a maximum contribution to the objective ahead—readiness for any threat to the national security.

The broad outline of the national program ahead is already in blueprint. That outline has been forged by the nation's prior course of action together with the impact of world events beyond our control. The 82d Congress will be faced with many problems in providing the framework within which the Executive branch of government may function. In this the Congress will play the vital role of steering the nation's course during the two years ahead.

The principal features of the program already before the new Congress which will eclipse all other action and will consume the greater portion of its time and efforts, include legislation as to:

- Taxes—to increase the federal revenue beyond the present rate of approximately 50 billions of dollars annually.
- Appropriations—to finance the military expansion and other features of the preparedness program with minimum non-defense spending.
- Military manpower—to provide for increased military forces with the minimum of disruption to essential civilian manpower.
- Foreign policy—including both economic and military assistance to friendly nations.
- Anti-inflation measures—involving policies as to price, wage and credit controls.

In attempting to anticipate or evaluate the legislative program for the two years ahead it is important to have in mind the composition of the new Congress. The party line-up of the 82d, as compared with the preceding Congress, is as follows:

	Senate		House	
	81st	82d	81st	82d
Democrats	54	49	263	235
Republicans	42	47	171	199
Other			1	1

Within the Democratic membership there is the so-called Southern bloc with more than 20 in the Senate and 100 in the House which has opposed the Administration on some domestic issues. Already in the new Congress this bloc has been evident in the activities of both Senate and House. In the Senate it was the Southern bloc that held the balance of power in the contest for the position of Majority Leader. In the House it was a coalition of Southern Democrats and Republicans that restored the power, taken away two years ago, of the Committee on Rules through which legislation ordinarily must be cleared for debate by the House.

In brief, this summarizes the background against which specific problems of individual industries will be considered.

In turning to the specific outlook in the 82d Congress for the petroleum industry, it must be remembered that oil is unique in one respect. It is the energy source that provides the mobility of the modern war machine—naval, army and air force. It is vital in warfare. Its essentiality can be no more emphatically portrayed than by relating oil's place in World War II. Of all the tonnage shipped overseas there were almost two tons of oil for each ton of all other supplies; twice as much oil as the total of all men, tanks, half-tracks, trucks, jeeps, ammunition, food, clothing and all the other hundreds of items that it takes to supply modern military forces scattered over the globe.

The importance of oil has a direct bearing on the legislative consideration to be given to it. First, oil's prominence in the preparedness program will focus the concern and attention of congress. The necessity for adequate supplies and sufficient reserve capacity may be the subject of congressional inquiry. Second, oil's prominence should warrant and invite the Executive branch of government to lend sympathetic support to legislation and regulations essential to assure adequate oil supplies. The fullest possible government-industry cooperation, but without crippling restrictions, is in the national interest. Unfortunately, this has not been realized by some in the past.

Some of the more important oil matters that may be expected to be before the new Congress are as follows:

Taxes

It is apparent that the federal revenues will be increased during the 82d

Congress. This will mean a tax boost in addition to the recent increases of individual and corporation income taxes and the more recent corporation excess profits tax. The existing tax rate is estimated to net a total annual revenue for the fiscal year ending in June, 1951, of approximately $50 billion. There are indications that the Congress will be considering additional revenues ranging from perhaps $10 to $25 billion. This substantial increase, on top of the already heavy tax burden, will undoubtedly result in the exploration of every possible source of new revenue. In addition to possible increases in the individual and corporation income taxes, it may be expected that the excise taxes will also be increased and broadened. There has been some speculation as to an over-all federal sales tax.

The scope and meaning of the anticipated tax rates and its impact upon our economy may be visualized by a comparison with the historical annual revenue collections. Prior to World War II, total collections never exceeded $6 billion level. During the war period the peak reached was less than $45 billion.

The petroleum industry, of course, expects to carry its fair share of the national tax burden. However, the essential provisions of the industry's tax structure that make it possible for the industry to meet its primary responsibility of providing adequate supplies of oil at all times must not be rendered ineffective. There are indications that again during the coming Congress there are those in the Executive branch of the government who will renew efforts to eliminate or make ineffective some of these basic tax provisions such as percentage depletion and the option to expense intangibles. For this reason, even though congressional review and industry experience over a long history have conclusively established the soundness of these provisions, the petroleum industry will have to be prepared to devote much of its attention during the coming Congress to unsound tax proposals.

This should not be the case in a time of emergency when the complete energies of all should be devoted to the preparedness program rather than wasted in defending against attempts to render the oil industry incapable of contributing its part to the national objective. If, however, during an emergency such as we now face an industry is rendered incapable of performing its primary function, then it is vulnerable to restrictive governmental controls. This the industry must avoid.

Imports

The import problem continues a matter that requires a long-term solution. With the current rate hovering at 1 million barrels daily and increasing month after month and year after year, independent domestic producers want a definite solution which recognizes an equitable relationship between domestic production and imports.

The coal industry has been active in seeking some means of curtailing imports, particularly residual fuel oils which the industry contends has caused irreparable injury to its normal markets. This group was vigorous in its efforts to secure legislative curtailment of imports during the preceding session of Congress. Already in the 82d Congress a bill has been introduced by Congressman Jenkins of Ohio designed to remove the threat of imports to the coal industry. His bill proposes a $1.05 tariff on fuel oil and substantial increases in the existing tariff on other oil products.

The Trade Agreements Act which will expire in June of this year will be up for extension. It perhaps will be one of the early matters to be considered. It has been under this law that the import tax on oil established by Congress in 1932 has been decreased and imports otherwise encouraged. For this reason, there will be active interest in a solution of the import problem at the time the Trade Agreements Act extension is before the Congress.

Natural Gas

One of the principal problems that continues to face the oil and gas industry is that of the Federal Power Commission's efforts to extend jurisdiction into the production and gathering of natural gas. The Commission since 1940 has endeavored to establish its authority to regulate the field sales of all producers of gas destined for interstate shipment. This problem involves a question that is basic to the U. S. form of government. It is a question that should be settled. It must be remembered that natural gas and oil are so closely associated that if Federal authority is once established over natural gas the next step would be to extend it to oil.

Recently there have been developments which bear on this problem. The Supreme Court has upheld the right of the state of Oklahoma to establish minimum wellhead prices on the sale of gas. The decision did not consider the question of federal jurisdiction over such prices, leaving undetermined the question as to whether or not FPC has paramount authority if it should desire to exercise it. The decision, therefore, does not allay any of the fears or confusion on the part of producers and gatherers concerning the Commission's efforts to usurp jurisdiction over them.

In line with FPC's efforts it has had scheduled for a long time an investigation of Phillips Petroleum Company to determine whether or not that company is subject to its regulation. The case recently was indefinitely postponed. This suggests that for the time of the emergency the Commission may suspend its efforts to protrude its jurisdiction into the field of independent production and gathering. If so, this would free the industry from the burden of meeting the Commission's efforts in this respect.

Other than the question of FPC's jurisdiction over production and gathering, there are certain additional natural gas matters that will be before the 82d Congress. One is with respect to the Federal Power Commission jurisdiction over gas distribution companies. The decision in the East Ohio case last year emphasized this issue. The National Association of Railroad and Utility Commissions has indicated that they will urge that this matter be considered by the new Congress. It may be expected that this will be a question that will be presented early in the new Congress.

Another gas matter that may be before the Congress pertains to the financing of "natural gas companies" under the Natural Gas Act of 1938. Last year Senator Lyndon Johnson of Texas introduced in the Senate and Congressman Crosser of Ohio introduced in the House companion bills designed to give FPC jurisdiction over the financing of "natural gas companies." These bills were not reported out of Committee in either House. At that time the interstate pipe lines opposed this proposed legislation as did the producers of natural gas. The position of the pipe line companies was that this is a field already fully occupied by the Security and Exchange Commission and the states. The producers become concerned with this matter because so long as the question remains open as to whether or not FPC has jurisdiction over the field sales of natural gas, the producers and gatherers are subject to being treated as "natural gas companies" under the act. If so treated, under the bills of last year they would be subject to FPC's regulatory control over financing activities including local banking transactions. There have been indica-

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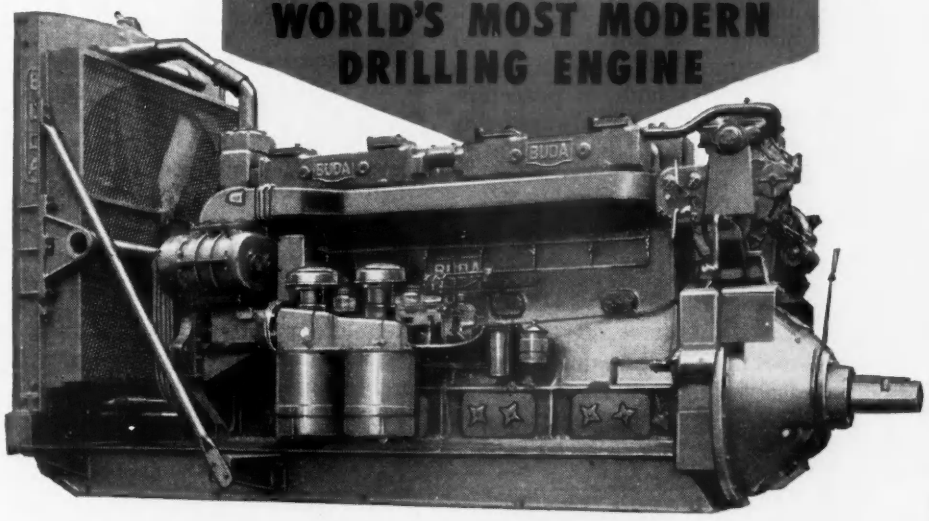

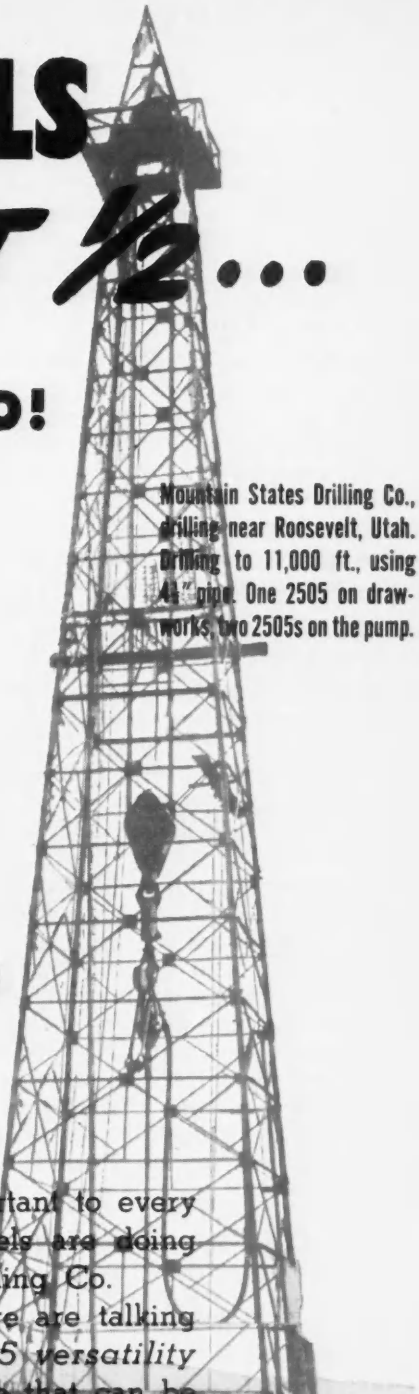

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tions that some in FPC favor renewal of this type of legislation. If so, the industry must be prepared to again present its views to Congress.

An additional matter that affects the interstate pipe lines is the bill already introduced by Congressman Heselton of Massachusetts conferring authority upon FPC to prescribe safety regulations.

Tidelands

The dispute between the states and the federal government as to title to the tidelands or submerged lands of the Continental Shelf has been before the Congress for several years. It already has been presented to the new Congress. Several so-called quit-claim bills, conferring title to the states have been introduced. A similar bill was vetoed by President Truman in 1946. Senator O'Mahoney has introduced a bill proposing an interim solution to the problem authorizing the Secretary of the Interior to issue leases on the submerged lands and providing that, within the three-mile limit, the adjoining states receive 37½ percent of the royalty. The balance of the royalty would be held by the U. S. Treasury pending final disposition by Congress. The U. S. Supreme Court in the California, Texas and Louisiana cases has held that the federal government has "paramount rights in, and full dominion and power over" such lands. The court has enjoined the states from further operations of these lands. To return the control to the states, where for many decades it rested, will require an act of Congress. Settlement of this dispute is of particular importance to the nation at this time because the tidelands offer great possibilities as to additional large reserves of petroleum. At present, development of the tidelands is stymied.

At present it appears that an interim solution may be the first to be considered by the new Congress, perhaps along the lines of the O'Mahoney bill, but one which would permit and encourage the oil industry to continue offshore exploration and development. In the previous Congress such an interim solution was proposed but was not acted upon.

Contract Renegotiation

A bill providing for renegotiation of government purchase contracts is now before Congress, having been introduced by Congressman Doughton of North Carolina. The propriety of renogiation during emergencies is fully recognized. This is necessary to assure sufficient supplies of essential materials and at the same time avoid unnecessary waste of public funds. The World War II law exempted all raw materials including crude oil and natural gas. The new proposal as introduced by Congressman Doughton did not exempt crude oil and natural gas, although as reported by the Ways and Means Committee the exemption was extended to oil and gas—but is limited to "the owner or operator of the property." In a war period or under a war preparedness program government purchases include many items which are not ordinarily made for peacetime civilian use. As a result, there is no guide provided by going prices established in a normal competitive market. Under such circumstances renegotiation provides the government a means of protection from unreasonable charges. Crude petroleum, however, is not such a war specialty commodity, since it has a wide civilian use both in peacetime and wartime with prices always being established under strong competitive conditions.

Renegotiation as to crude and natural gas would be impractical and and most disruptive of normal operations within the industry. If subject to renegotiation the crude producer would not know for a long time, perhaps several years, the final price to expect for his product. This in turn would mean that settlement with the thousands of royalty owners who normally are paid promptly, would be in confused suspense until some unknown future date. The application of renegotiation to crude and natural gas would introduce an uncertainty that would only result in deterring the industry's contribution to the preparedness program.

A bill similar to the current bill was introduced during the last session of Congress and hearings were held thereon in August, 1950. It subjected all raw materials to renegotiation. The petroleum industry appeared at the August hearings in opposition to the application of renegotiation to crude petroleum and natural gas. This is another matter that the petroleum industry will face during the current session.

Fuels Investigation

The Senate Interior and Insular Affairs Committee has before it the fuels investigation authorized by the Myers' resolution of the preceding Congress. The purpose of this investigation as set forth in the authorizing legislation is to provide a full and complete investigation of fuel reserves in the U. S., including oil, gas, coal and anthracite, and to formulate a national fuel policy to include "the use of all fuels and energy . . ."

It is expected that hearings will be held by the committee in the near future.

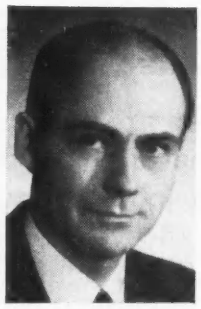
Acquired Lands

Proposed legislation providing for the leasing of federally owned acquired lands on a competitive basis rather than under the Mineral Leasing Act applicable to the Public Lands will again be before the Congress. Several bills were introduced last year. Congressman William of Mississippi has introduced a similar bill in the new Congress.

Conclusion

The above matters, together with the many items of general legislation that will have an indirect effect upon the petroleum industry, show that there will be much activity in the new Congress that will necessitate the industry's careful attention. In addition to legislation, various committees of Congress may conduct investigations pertaining to one aspect or another of the petroleum industry and its operations. In all, a heavy program is ahead which will have effects upon each individual operator, large and small, in the petroleum industry.

About the Author



L. DAN JONES was graduated in petroleum engineering from the University of Oklahoma, and later received his law degree from George Washington University in Washington, D. C. He was admitted to the District of Columbia Bar in 1939. Prior to World War II he was an attorney for Indiana coal producers in Terre Haute, Ind., and at the advent of war joined the Army in artillery. After his release from service in 1946, he joined Independent Petroleum Association of America as attorney, and has been with IPAA since.

Set in Drilling 8745 Tests

By CECIL W. SMITH
Statistical Editor

THE year 1950 was one of vigorous and successful exploratory drilling for the U. S. petroleum industry. Within that period 8745 exploratory tests were completed to make it the most active drilling year in history and to exceed the previous peak of 7721 tests set in 1949. Not only were exploratory wells completed at a more rapid rate than ever before, but a fair part of them were productive. Percentagewise, the producers of 1950 broke no records and didn't quite match the ratio of 1949, but in total numbers they topped the best previous year's.

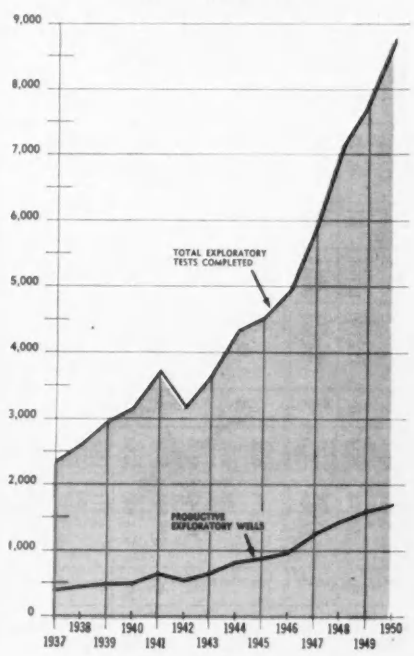
The year's search for new sources of oil and gas was a part of the industry's over-all drilling campaign that accounted for a record of 43,204 new wells completed. Actually, exploration accounted for only about one-fourth of the year's total drilling, but in importance it should be ranked first. For it is only through exploratory drilling that future petroleum supplies are located. Other than exploratory drilling is, of course, development drilling for the exploitation of previous exploratory discoveries.

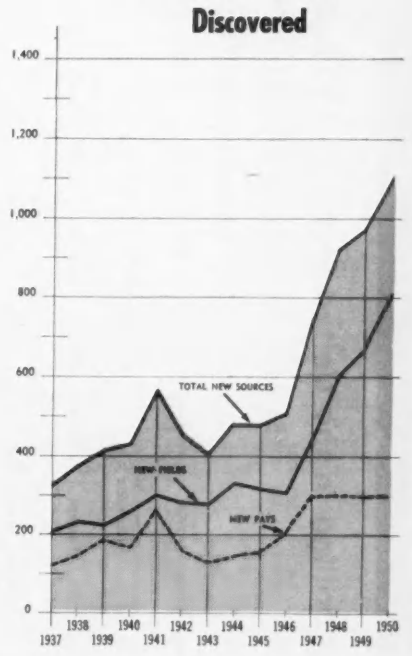
Although there were more dry holes drilled for every exploratory producer during 1950 than had been the case in the peak year of 1949, the year's work was still considered quite successful. The volume of drilling alone accounted for more discoveries than had ever been made in a single year.

Out of the total 8745 exploratory wells completed, 1670 were finaled as commercial producers. That was only 19.1 percent of the total, but exceeded the 1589 producers that amounted to 20.6 percent of the 7721 total of 1949.

Of the year's successful tests, 816 opened new oil fields and 301 others found new oil producing horizons in established fields, to add 1117 new oil pools. In 1949, new oil pools totaled 964 and were composed of 668 new fields and 296 new pay strata.

Attesting to the success of the year's exploration are the estimates of additions to crude reserves, which show that more than 3½ billion barrels were added. About ⅓ billion barrels less were credited to 1949. The above reserve figures represent reserves added through drilling and do not reflect net additions after the year's production is deducted. Of course, not all reserves additions can be credited to the year's discoveries, for part of them are calculated on basis of development drilling in expanding fields. But it can be safely assumed that the record-breaking campaign of 1950 located enough new supplies





YEAR	Total New Oil, Gas and Distillate Sources Found			New Oil Sources Found			New Gas Sources Found			New Distillate Sources Found		
	Total	New Fields	New Pays	Total	New Fields	New Pays	Total	New Fields	New Pays	Total	New Fields	New Pays
1937	376	239	137	322	203	119	48	33	15	6	3	3
1938	423	264	159	373	229	144	42	31	11	8	4	4
1939	473	258	215	414	224	190	55	33	22	4	1	3
1940	492	309	183	428	261	167	62	46	16	2	2	0
1941	650	362	288	562	301	261	83	58	25	5	3	2
1942	523	348	175	451	288	163	57	47	10	15	13	2
1943	499	347	152	403	276	127	72	56	16	24	15	9
1944	633	460	173	475	326	149	117	102	15	41	32	9
1945	647	451	187	475	317	158	128	113	15	44	30	14
1946	688	412	276	513	308	205	104	75	29	71	29	42
1947	979	576	403	736	436	300	145	96	49	98	44	54
1948	1192	792	400	917	610	307	160	112	48	115	70	45
1949	1264	867	397	964	668	296	179	130	49	121	69	52
1950	1347	1009	338	1117	816	301	145	126	19	85	67	18

Results of Exploratory Drilling in the United States in 1950, by States, and Comparison with Earlier Years

(Based on Data Compiled by Staff of WORLD OIL)

Part 1. Productive Tests

State or District	OIL									DISTILLATE									GAS									TOTAL		
	New Fields			New Pays			Extensions			New Fields			New Pays			Extensions			New Fields			New Pays			Extensions					
	No.	Footage	Avge. Depth	No.	Footage	Avge. Depth	No.	Footage	Avge. Depth	No.	Footage	Avge. Depth	No.	Footage	Avge. Depth	No.	Footage	Avge. Depth	No.	Footage	Avge. Depth	No.	Footage	Avge. Depth	No.	Footage	Avge. Depth	No.	Footage	Avge Depth
Alabama	1	8,093	8093	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	1	2,302	2302	..	.....	.....	..	.....	.....	2	10,395	5198
Arkansas	9	49,339	5482	1	7,779	7779	2	8,203	4102	1	7,403	7403	..	.....	.....	..	.....	.....	1	3,584	3584	..	.....	.....	..	.....	.....	14	76,308	5451
California	17	63,274	3722	13	62,733	4826	19	120,874	6362	..	.....	.....	..	.....	.....	..	.....	.....	1	4,300	4300	1	5,158	5158	3	12,531	4177	54	268,870	4979
Colorado	8	42,263	5283	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	2	9,406	4703	1	5,639	5639	2	11,074	5537	13	68,382	5260
Illinois	24	65,045	2710	21	50,147	2388	69	185,046	2682	..	.....	.....	..	.....	.....	..	.....	.....	1	3,315	3315	1	572	572	2	3,570	1785	118	307,695	2608
Indiana	41	72,548	1769	10	18,775	1878	5	8,967	1793	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	56	100,290	1791
Kansas	105	368,001	3505	2	7,034	3517	2	6,838	3419	..	.....	.....	..	.....	.....	..	.....	.....	6	28,007	4668	..	.....	.....	..	.....	.....	115	409,880	3564
Kentucky	20	37,509	1875	3	4,419	1473	3	4,973	1658	..	.....	.....	..	.....	.....	..	.....	.....	1	942	942	..	.....	.....	..	.....	.....	27	47,843	1772
Louisiana	30	267,702	8923	17	157,993	9294	10	76,106	7611	10	111,780	11178	9	96,123	10680	4	36,713	9178	2	25,938	12969	3	13,886	4629	2	16,417	8208	87	802,658	9226
North Louisiana	12	72,549	6046	2	12,134	6067	5	31,605	6321	2	17,824	8912	4	40,909	10227	2	15,763	7881	..	.....	.....	3	13,886	4629	1	7,927	7927	31	212,597	6858
South Louisiana	18	195,153	10842	15	145,859	9724	5	44,501	8900	8	93,956	10245	5	55,214	11043	2	20,950	10475	2	25,938	12969	..	.....	.....	1	8,490	8490	56	590,061	10537
Maryland	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	1	2,869	2869	..	.....	.....	..	.....	.....	1	2,869	2869
Michigan	28	61,088	2182	3	12,813	4271	3	10,874	3625	..	.....	.....	..	.....	.....	..	.....	.....	5	12,857	2571	1	1,375	1375	..	.....	.....	40	99,007	2475
Mississippi	11	82,990	7545	2	21,277	10638	..	.....	.....	2	19,635	9868	..	.....	.....	2	12,418	6209	..	.....	.....	..	.....	.....	..	.....	.....	17	136,320	8019
Montana	2	10,752	5376	..	.....	.....	2	4,193	2096	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	1	2,924	2924	5	17,869	3574
Nebraska	3	13,162	4387	..	.....	.....	3	14,308	4769	..	.....	.....	..	.....	.....	..	.....	.....	5	26,076	5215	..	.....	.....	1	4,915	4915	12	58,461	4872
New Mexico	14	89,873	6420	5	38,775	7755	10	61,548	6155	..	.....	.....	..	.....	.....	..	.....	.....	2	11,910	5855	..	.....	.....	..	.....	.....	31	202,106	6520
Ohio	..	.....	.....	..	.....	.....	2	4,871	2435	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	2	7,405	3703	4	12,276	3069
Oklahoma	69	278,572	4037	29	119,445	4119	40	209,051	5226	4	28,546	7137	1	9,498	9498	1	6,436	6436	9	33,110	3679	1	5,798	5798	2	4,409	2205	156	694,865	4454
Pennsylvania	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	1	6,305	6305	..	.....	.....	..	.....	.....	1	6,305	6305
Texas	422	2,025,047	4799	184	1,196,159	6502	107	615,936	5756	50	405,443	8109	8	59,078	7385	5	45,945	9189	85	455,964	5364	11	72,485	6590	11	69,684	6335	883	4,945,741	5601
Dist. 1 S. Central	14	37,385	2670	2	12,890	6445	2	3,411	1705	2	16,030	8015	1	8,023	4012	..	.....	.....	1	1,790	1790	1	3,310	3310	..	.....	.....	23	82,839	3602
Dist. 2 Middle Gulf	16	99,294	6206	12	71,291	5941	1	9,250	9250	11	88,479	8044	2	10,520	5260	3	27,623	9208	16	93,513	5845	4	23,054	5764	5	25,030	5006	70	448,054	6401
Dist. 3 Upper Gulf	23	166,940	7258	48	358,811	7475	14	108,507	7475	16	147,167	9198	2	16,013	8006	2	18,322	9161	7	47,960	6851	4	31,343	7836	4	31,682	7921	126	926,745	7723
Dist. 4 L. Gulf-S.W.	24	132,014	5501	49	328,218	6698	..	.....	.....	9	72,985	8109	3	24,522	8174	..	.....	.....	19	137,657	7245	2	14,778	7389	..	.....	.....	106	710,174	6700
Dist. 4 East Central	6	14,727	2455	1	3,648	3648	2	15,813	7906	1	8,505	8505	..	.....	.....	..	.....	.....	1	2,987	2987	..	.....	.....	..	.....	.....	11	45,680	4153
Dist. 6 Northeast	8	45,089	5636	4	32,644	8161	4	33,074	8269	4	29,022	7256	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	2	12,972	6486	22	152,801	6946
Dist. 7-B N. Cent	150	523,919	3493	12	42,799	3567	11	43,320	3938	3	13,990	4663	..	.....	.....	..	.....	.....	20	66,175	3309	..	.....	.....	..	.....	.....	196	690,203	3521
Dist. 7-C W. Cent	27	130,193	4822	10	52,791	5279	10	45,149	4515	3	23,907	7969	..	.....	.....	..	.....	.....	5	17,056	3411	..	.....	.....	..	.....	.....	55	269,096	4893
Dist. 8 West	63	492,225	7813	35	244,843	6996	38	240,211	6321	..	.....	.....	..	.....	.....	..	.....	.....	1	2,868	2868	..	.....	.....	..	.....	.....	137	980,147	7154
Dist. 9 North	90	376,799	4187	11	48,224	4384	25	117,201	4688	1	5,358	5358	..	.....	.....	..	.....	.....	15	85,958	5730	..	.....	.....	..	.....	.....	142	633,540	4462
Dist. 10 Panhandle	1	6,462	6462	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	1	6,462	6462
Utah	..	.....	.....	2	13,723	6861	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	..	.....	.....	2	13,723	6861
Wyoming	12	77,528	6461	9	62,475	6942	8	46,552	5819	..	.....	.....	..	.....	.....	..	.....	.....	3	17,781	5927	..	.....	.....	..	.....	.....	32	204,336	6386
U.S. Total, 1950	816	3,612,786	4427	301	1,773,547	5892	285	1,378,340	4836	67	572,807	8549	18	164,699	9150	12	101,512	8459	126	644,666	5116	19	104,913	5522	26	132,929	5113	1670	8,486,199	5082
U. S Total, Earlier Years																														
1937	203	831,123	4094	119	615,007	5168	3	9,036	3012	3	19,377	6459	3	24,574	8191	..	.....	.....	33	77,389	2345	15	51,145	3410	..	.....	.....	379	1,627,651	4295
1938	229	944,455	4124	144	815,186	6561	7	25,027	3575	4	23,657	5914	4	27,115	6779	..	.....	.....	31	102,440	3350	11	49,634	4512	3	12,042	4014	433	1,999,556	4618
1939	224	782,289	3492	190	998,595	5256	..	.....	.....	1	7,999	7999	3	24,709	8236	..	.....	.....	33	103,450	3135	22	92,626	4210	..	.....	.....	473	2,009,668	4249
1940	262	957,167	3667	167	914,442	5476	..	.....	.....	2	12,792	6396	..	.....	.....	..	.....	.....	46	122,439	2662	16	55,983	3499	..	.....	.....	493	2,062,823	4193
1941	301	1,165,966	3874	261	1,335,648	5117	..	.....	.....	3	23,505	7835	2	7,109	3555	..	.....	.....	58	177,974	3069	25	89,263	3571	..	.....	.....	650	2,799,465	4307
1942	288	1,199,382	4165	163	879,116	5393	..	.....	.....	13	121,620	9355	2	13,517	6759	..	.....	.....	48	167,428	3562	10	50,712	5071	..	.....	.....	524	2,431,775	4650
1943	276	1,232,396	4465	127	565,454	4452	132	559,090	4236	15	140,564	9371	9	88,031	9781	3	25,589	8530	56	212,814	3800	16	90,372	5648	10	58,996	8530	644	2,973,306	4617
1944	326	1,422,250	4363	149	731,764	4911	135	659,987	4889	32	250,228	7820	9	75,436	8382	10	79,797	7980	102	417,944	4097	15	95,099	6340	27	111,174	4118	805	3,843,679	4775
1945	317	1,503,763	4774	158	894,688	5663	154	702,822	4564	30	269,915	8997	14	140,464	10933	6	54,162	9027	113	486,529	4306	15	67,455	4497	70	216,103	3087	877	4,335,901	4944
1946	308	1,359,787	4415	205	1,227,305	5987	160	707,585	4422	29	264,441	9119	42	411,425	9796	7	63,111	9016	75	272,564	3634	29	166,588	5744	115	406,774	3537	970	4,879,580	5030
1947	436	1,999,100	4585	300	1,564,181	5214	169	693,950	4106	44	352,691	8016	54	505,112	9354	17	136,258	8015	96	403,038	4198	49	223,026	4552	77	254,076	3300	1242	6,131,432	4937
1948	610	2,760,127	4525	307	1,714,345	5584	170	758,977	4465	70	626,026	8943	45	432,625	9614	18	167,441	9302	112	514,990	4598	48	259,025	5396	41	162,801	3971	1421	7,396,357	5205
1949	668	3,027,759	4533	296	1,666,576	5630	273	1,233,190	4517	69	644,454	9340	52	459,017	8827	16	131,981	8249	130	626,058	4816	49	220,023	4490	36	141,146	3921	1589	8,150,204	5129

Unproductive Tests and Total Exploratory Tests

Part 2

STATE or DISTRICT	DRY WILDCATS			DRY NEW PAY TESTS			DRY OUTPOSTS			TOTAL DRY			TOTAL EXPLORATORY TESTS		
	No.	Footage	Average Depth	No.	Footage	Average Depth	No.	Footage	Average Depth	No.	Footage	Average Depth	No.	Footage	Average Depth
Alabama	20	105,302	5265	....	.....	....	....	.....	....	20	105,302	5265	22	115,697	5265
Arizona	8	32,108	4013	....	.....	....	....	.....	....	8	32,108	4013	8	32,108	4013
Arkansas	84	325,772	3878	....	.....	....	2	6,510	3255	86	332,282	3864	100	408,590	4086
California	342	1,169,473	3420	3	16,592	5531	39	163,979	4205	384	1,350,044	3516	438	1,618,914	3696
Colorado	49	187,073	3818	....	.....	....	4	16,667	4167	53	203,740	3844	66	272,122	4123
Florida	8	34,409	4301	....	.....	....	....	.....	....	8	34,409	4301	8	34,409	4301
Georgia	4	13,464	3366	....	.....	....	....	.....	....	4	13,464	3366	4	13,464	3366
Illinois	729	1,682,991	2309	....	.....	....	....	.....	....	729	1,682,991	2309	847	1,990,686	2350
Indiana	441	791,317	1794	....	.....	....	17	28,483	1675	458	819,800	1790	514	920,090	1790
Idaho	5	16,367	3273	....	.....	....	....	.....	....	5	16,367	3273	5	16,367	3273
Kansas	651	2,321,698	3566	....	.....	....	....	.....	....	651	2,321,698	3566	766	2,731,578	3566
Kentucky	108	215,738	1998	....	.....	....	....	.....	....	108	215,738	1998	135	263,581	1952
Louisiana	246	1,892,380	7693	1	4,330	4330	7	43,612	6230	254	1,940,322	7639	341	2,742,980	8044
North Louisiana	128	646,436	5052	1	4,330	4330	5	25,109	5022	134	675,875	5044	165	888,472	5385
South Louisiana	118	1,245,944	10559	....	.....	....	2	18,503	9252	120	1,264,447	10537	176	1,854,508	1053
Maryland	3	13,767	4589	....	.....	....	....	.....	....	3	13,767	4589	4	16,636	4159
Michigan	301	734,125	2439	....	.....	....	....	.....	....	301	734,125	2439	341	833,132	2443
Mississippi	132	993,189	7524	1	10,206	10206	5	43,311	8662	138	1,046,706	7585	155	1,183,026	6732
Missouri	6	11,078	1846	....	.....	....	....	.....	....	6	11,078	1846	6	11,078	1846
Montana	57	179,163	3143	....	.....	....	2	5,012	2506	59	184,175	3122	64	202,044	3157
Nebraska	57	221,814	3891	....	.....	....	1	3,353	3353	58	225,167	3882	70	283,628	4052
Nevada	2	14,439	7220	....	.....	....	....	.....	....	2	14,439	7220	2	14,439	7220
New Mexico	68	331,670	4878	....	.....	....	6	42,070	7012	74	373,740	5051	105	575,846	5484
North Dakota	3	27,062	9021	....	.....	....	....	.....	....	3	27,062	9021	3	27,062	9021
Ohio	16	58,697	3669	....	.....	....	....	.....	....	16	58,697	3669	20	70,973	3549
Oklahoma	512	1,972,080	3852	....	.....	....	....	.....	....	512	1,972,080	3852	668	2,666,945	3992
Pennsylvania	....	.....	....	....	.....	....	....	.....	....	....	.....	....	1	6,305	6305
South Dakota	8	24,542	3068	....	.....	....	....	.....	....	8	24,542	3068	8	24,542	3068
Tennessee	4	7,016	1754	....	.....	....	....	.....	....	4	7,016	1754	4	7,016	1754
Texas	2,787	11,712,419	4203	2	9,308	4654	195	899,769	4614	2,984	12,621,496	4230	3,867	17,567,237	4543
Dist. 1 South Central	203	562,929	2773	....	.....	....	6	11,110	1852	209	574,039	2747	232	656,878	2831
Dist. 2 Middle Gulf	154	881,408	5723	....	.....	....	23	153,396	6669	177	1,034,804	5846	247	1,482,858	6003
Dist. 3 Upper Gulf	243	1,697,596	6986	....	.....	....	17	108,367	6375	260	1,805,963	6946	380	2,732,708	7191
Dist. 4 Lower Gulf-S.W.	282	1,370,583	4860	....	.....	....	17	69,701	4100	299	1,440,284	4817	4 5	2,150,458	5310
Dist. 5 East Central	71	244,679	3446	....	.....	....	....	.....	....	71	244,679	3446	82	290,359	3541
Dist. 6 Northeast	84	439,736	5235	1	547	547	5	32,490	6497	90	472,773	5253	112	625,574	5585
Dist. 7-B North Central	633	1,791,883	2831	....	.....	....	21	66,259	3155	654	1,858,142	2841	850	2,548,345	2998
Dist. 7-C West Central	209	875,342	4188	1	8,761	8761	22	90,630	4120	232	974,733	4201	287	1,243,829	4334
Dist. 8 West	308	1,918,993	6230	....	.....	....	28	155,035	5537	336	2,074,028	6173	473	3,054,175	6457
Dist. 9 North	586	1,822,652	3110	....	.....	....	56	212,781	3800	642	2,035,433	3170	784	2,668,973	3404
Dist. 10 Panhandle	14	106,618	7616	....	.....	....	....	.....	....	14	106,618	7616	15	113,080	7539
Utah	18	55,102	3061	....	.....	....	....	.....	....	18	55,102	3061	20	68,825	3441
Washington	2	16,032	8016	....	.....	....	....	.....	....	2	16,032	8016	2	16,032	8016
Wyoming	104	494,025	4750	1	7,518	7518	14	79,993	5714	119	581,536	4887	151	785,872	5204
United States Total, 1950	6,775	25,654,312	3787	8	47,954	5994	292	1,332,759	4564	7,075	27,035,025	3821	8,745	35,521,224	4062
U. S. Total, Earlier Years															
1937	1,943	7,173,550	3692	....	.....	....	....	.....	....	1,943	7,173,550	3692	2,322	8,801,201	3790
1938	2,179	7,012,901	3218	....	.....	....	....	.....	....	2,179	7,012,901	3218	2,612	9,012,457	3450
1939	2,488	7,764,816	3121	....	.....	....	....	.....	....	2,488	7,764,816	3121	2,961	9,774,484	3301
1940	2,672	8,649,828	3237	....	.....	....	....	.....	....	2,672	8,649,828	3237	3,165	10,712,651	3386
1941	3,047	9,651,013	3167	....	.....	....	....	.....	....	3,047	9,651,013	3167	3,697	12,450,478	3368
1942	2,652	9,320,691	3515	....	.....	....	....	.....	....	2,652	9,320,691	3515	3,176	11,752,466	3702
1943	2,951	10,702,429	3627	....	.....	....	36	164,155	4560	2,987	10,866,584	3638	3,631	13,839,890	3812
1944	3,425	13,470,846	3933	22	141,039	6411	73	383,802	5258	3,520	13,995,687	3976	4,325	17,839,366	4125
1945	3,486	14,504,642	4161	39	284,441	7293	108	375,062	3473	3,633	15,164,145	4174	4,510	19,500,046	4324
1946	3,830	14,399,824	3760	38	274,592	7226	109	418,919	3843	3,977	15,093,335	3795	4,947	19,972,915	4037
1947	4,407	17,068,382	3873	59	331,897	5608	166	659,738	3974	4,632	18,059,017	3899	5,874	24,190,449	4118
1948	5,618	22,227,790	3957	23	127,597	5548	135	574,023	4252	5,776	22,929,410	3970	7,197	30,325,767	4214
1949	5,914	22,044,695	3728	46	183,003	3978	172	747,516	4346	6,132	22,975,214	3747	7,721	31,125,418	4031

to deserve being called "quite successful."

Discoveries of natural gas were not as numerous in 1950 as they had been a year earlier. In all, 145 new gas pools were located, and they were 126 new fields and 19 new pays. In 1949, the count had been 179 new pools, 130 fields and 49 new pay horizons.

Distillate finds were also fewer than a year before. Eighty-five distillate pools were discovered in 1950, but they totaled 121 in 1949. In the year just past the discoveries were classed as 67 new fields and 18 pays. Previously they had been 69 fields and 52 pays.

All the above figures dealt with exploratory wells and that classification is made up of strict wildcats, new pay tests in established fields, and major extension tries at existing producing areas. Considering nothing but strict wildcats, it is found that those wells totaled 7780 and accounted for 18 percent of the new wells drilled in 1950, while a year earlier wildcats represented 17.4 percent of the total wells.

The year just past also had a slight edge in wildcatting success over the previous year. A total of 1009 wildcats opened new fields for a score of 13 percent of all wildcats drilled, while 867 producers in 1949 amounted to 12.8 percent. Both of those periods topped the 13-year average of 11.3 percent.

Ratio of Wildcatting to all Drilling and Proportion of Wildcats Discovering New Fields By Districts, 1937-1950

STATE or DISTRICT	THIRTEEN YEARS, 1937-1949						YEAR, 1950					
	Total New Wells Drilled (All Classes)	*STRICT WILDCATS					Total New Wells Drilled (All Classes)	*STRICT WILDCATS				
		TOTAL			PRODUCTIVE			TOTAL			PRODUCTIVE	
		Number	Percent of All Wells	Dry	Number	Percent of All Wells		Number	Percent of All Wells	Dry	Number	Percent of All Strict Wildcats
Alabama	219	166	75.8	163	3	1.8	45	22	48.9	20	2	9.1
Arizona	34	34	100.0	34	.....	.....	7	7	100.0	7	.....	.....
Arkansas	3,149	766	24.3	705	61	8.0	397	95	23.9	84	11	11.6
California	21,090	2,556	12.1	2,426	130	5.1	1,791	360	20.1	342	18	5.0
Colorado	935	221	23.6	205	16	7.2	87	59	67.8	49	10	16.9
Florida	146	132	90.4	131	1	.7	11	8	72.7	8	.....	.....
Georgia	42	42	100.0	42	.....	.....	3	3	100.0	3	.....	.....
Idaho	.....	.....	.....	.....	.....	.....	5	5	100.0	5	.....	.....
Illinois	31,716	6,031	19.0	5,660	371	6.1	2,910	754	25.9	729	25	3.3
Indiana	6,534	1,770	27.1	1,599	171	9.7	1,575	482	30.6	441	41	8.5
Iowa	17	17	100.0	17	.....	.....	.....	.....	.....	.....	.....	.....
Kansas	27,396	4,389	16.0	3,694	695	15.8	3,998	762	19.1	651	111	14.6
Kentucky	11,053	1,168	10.6	1,047	121	10.3	1,247	129	10.3	108	21	16.3
Louisiana	18,087	2,406	13.3	2,061	345	14.3	2,444	288	11.8	246	42	14.6
North Louisiana	9,440	1,304	13.8	1,198	106	8.1	1,311	142	10.8	128	14	9.9
South Louisiana	8,647	1,102	12.7	863	239	21.7	1,133	146	12.9	118	28	19.2
Maryland	4	4	100.0	3	1	25.0	4	4	100.0	3	1	25.0
Michigan	11,342	3,278	28.9	3,042	236	7.2	829	334	40.3	301	33	9.9
Mississippi	2,843	942	33.1	903	39	4.1	322	145	45.0	132	13	9.0
Missouri	846	208	24.6	204	4	1.9	27	6	22.2	6	.....	.....
Montana	3,171	249	7.9	209	40	16.1	268	59	22.0	57	2	3.4
Nebraska	304	175	57.6	171	4	2.3	107	65	60.7	57	8	12.3
Nevada	1	1	100.0	1	.....	.....	2	2	100.0	2	.....	.....
New Jersey	1	1	100.0	1	.....	.....	.....	.....	.....	.....	.....	.....
New Mexico	6,606	756	11.4	660	96	12.7	593	84	14.2	68	16	19.0
New York	14,865	60	.4	58	2	3.3	723	.....	.....	.....	.....	.....
North Carolina	12	12	100.0	12	.....	.....	.....	.....	.....	.....	.....	.....
North Dakota	21	9	42.9	9	.....	.....	3	3	100.0	3	.....	.....
Ohio	15,161	365	2.4	319	46	12.6	970	16	1.6	16	.....	.....
Oklahoma	33,162	4,311	13.0	3,592	719	16.7	5,226	594	11.4	512	82	13.8
Oregon	5	5	100.0	5	.....	.....	.....	.....	.....	.....	.....	.....
Pennsylvania	46,746	74	.1	44	30	40.5	1,616	1	0.1	.....	1	100.0
South Carolina	4	4	100.0	4	.....	.....	.....	.....	.....	.....	.....	.....
South Dakota	23	22	95.7	22	.....	.....	7	7	100.0	7	.....	.....
Tennessee	421	212	50.3	196	16	7.5	3	3	100.0	3	.....	.....
Texas	123,158	19,247	15.6	16,828	2,419	12.6	16,757	3,344	20.0	2,787	557	16.7
Dist. 1 S. Central	3,985	1,629	40.9	1,546	83	5.1	509	220	43.2	203	17	7.7
Dist. 2 Middle Gulf	[1]	[1]	.....	[1]	[1]	.....	689	197	28.6	154	43	21.8
Dist. 3 Upper Gulf	12,422	2,042	16.4	1,781	261	12.8	1,591	289	18.2	243	46	15.9
Dist. 4 L. Gulf-S.W.	24,474	4,980	20.3	4,356	624	12.5	1,660	334	20.1	282	52	15.6
Dist. 5 East Central	[2]	[2]	.....	[2]	[2]	.....	206	79	38.3	71	8	10.1
Dist. 6 Northeast	13,032	1,567	12.0	1,451	116	7.4	715	96	13.4	84	12	12.5
Dist. 7-B N. Central	[3]	[3]	.....	[3]	[3]	.....	2,085	806	38.7	633	173	21.5
Dist. 7-C W. Central	[4]	[4]	.....	[4]	[4]	.....	925	244	26.4	209	35	14.3
Dist. 8 West	27,634	2,263	8.2	1,901	362	16.0	4,129	372	9.0	308	64	17.2
Dist. 9 North	34,375	6,641	19.3	5,678	963	14.5	3,190	692	21.7	586	106	15.3
Dist. 10 Panhandle	7,236	125	1.7	115	10	8.0	1,058	15	1.5	14	1	6.7
Utah	114	60	52.6	54	6	10.0	24	18	75.0	18	.....	.....
Virginia	53	11	20.7	7	4	36.4	.....	.....	.....	.....	.....	.....
Washington	25	25	100.0	25	.....	.....	2	2	100.0	2	.....	.....
West Virginia	10,366	88	.8	58	30	34.1	607	.....	.....	.....	.....	.....
Wyoming	2,752	454	16.5	366	88	19.4	594	119	20.0	104	15	12.6
Total United States	392,424	50,271	12.8	44,577	5,694	11.3	43,204	7,780	18.0	6,771	1,009	13.0
U.S. Total by Years, 1937-1949												
1937	35,213	2,182	6.2	1,943	239	10.9						
1938	29,127	2,443	8.4	2,179	264	10.8						
1939	28,012	2,746	9.8	2,488	258	9.4						
1940	31,149	2,982	9.6	2,672	310	10.4						
1941	32,510	3,409	10.5	3,047	362	10.6						
1942	21,990	3,001	13.6	2,652	349	11.6						
1943	20,349	3,298	16.2	2,951	347	10.5						
1944	25,786	3,885	15.1	3,425	460	11.8						
1945	26,649	3,946	14.8	3,486	460	11.7						
1946	30,230	4,242	14.0	3,830	412	9.7						
1947	33,147	4,983	15.0	4,407	576	11.5						
1948	39,477	6,410	16.2	5,618	792	12.3						
1949	38,962	6,781	17.4	5,914	867	12.8						

* Exclusive of all tests seeking new pay zones or outposts attempting to extend known fields.

[1] Dist. 2 included with Dist. 4.

[2] Dist. 5 included with Dist. 6.

[3] Dist. 7-B included with Dist. 9.

[4] Dist. 7-C included with Dist. 8.

RE YOU LOOKING FOR *Reefs*.

Courtesy of Dr. D. E. Feray, Univ. of Tulsa

Bibliography of Organic Reefs, Bioherms, and Biostromes.

Compiled as a service to THE OIL INDUSTRY by Seismograph Service Corporation TULSA, OKLAHOMA, U.S.A.

THE GEOLOGIST TAKES A NEW LOOK

The recent realization of the importance of organic reefs in the accumulation of petroleum has opened up broad, new vistas in the application of geology to the discovery of future oil reserves.

THE SEISMOLOGIST TAKES A NEW LOOK

The successful resolution of seismic data in possible reef areas involves, first, a thorough knowledge of the fundamentals of reef origin, occurrence, and characteristics.

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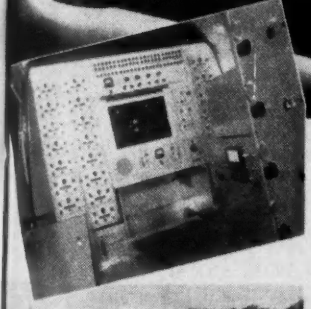
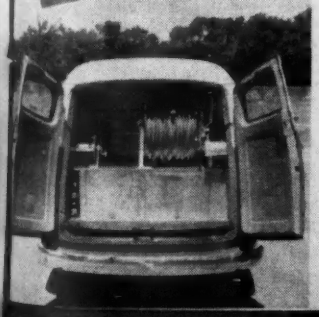
Seismograph Service SSC Now oth... a Pilot Crew for preliminary surveys





The research division of SSC provides another "tool" for more accurate seismic exploration.

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This unit should contribute to more accurate surveys as well as to effect economies in time and materials.

THE EQUIPMENT consists of —

1. Standard 24 trace recording unit.
2. 40 trace camera — permitting multiple recording.
3. Bank of 4 flat response amplifiers.
4. 4 trace variable area recording camera (recording the output of the flat response amplifiers).

In general, the test shooting will be carried out on a 12-trace geophone spread, with the additional amplifiers paralleled to allow the recording of two filter settings and mixing on each shot.

For laboratory study of the test shooting the records made with the variable area camera may be analyzed, when desired, with variable area reproducing equipment.

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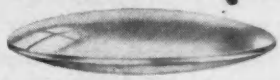
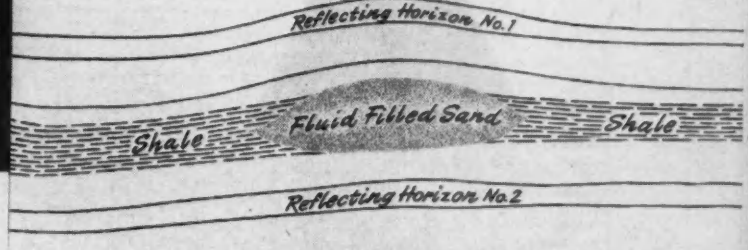
This is IT !





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GEOPHYSICAL CREWS

More Active During 1950

THIRTY-FOUR more geophysical and core drilling crews were afield at the end of 1950 than in the previous year.

Reversing the trend for 1949, when 452 crews were active compared with 559 in busy 1948, the industry had 486 crews seeking favorable geological structures at the end of 1950.

Both geophysical and core drilling crews were more active in 1950 than in 1949. Geophysical crews totaled 465 at the end of 1950 compared with 432 in 1949, and there was one more core drilling crew—21 to 20—in 1950 than the year before.

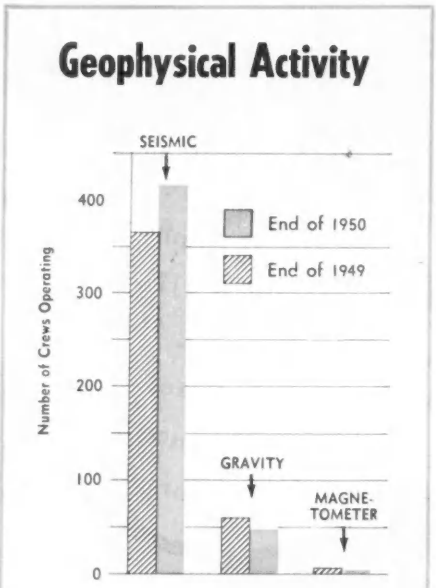
Growing preference for seismic operations is reflected in comparative figures for geophysical methods during the last three years.

In 1948, there were 427 seismic crews afield out of 519 of all classes of geophysical crews, which represented 82.3 percent of the total.

In 1949 there were 365 seismic crews out of 432, all geophysical classes, for a percentage of 84.5.

At 1950's end, 415 seismic crews were at work out of 465, all classes, representing 89.2 percent of the total.

There were 48 gravity meter crews working in 1950, compared with 60 in 1949 and 84 in 1948. Magnetometer crews slumped to two, from seven in 1949 and eight in 1948.



Echoing its leadership in other operations, Texas once again was at the forefront with 170 geophysical crews and four core drilling for a total of 174 that compared with 144 geophysical and three core drilling crews in 1949. A repeater within the state was West Texas, which kept busy 77 geophysical and core drilling crews. Second in the state was Southeast Texas with 48, followed by Southwest Texas with 37 and East Texas with 12.

East Texas was the only one of the quartet with less activity in 1950 than in 1949. The year-ago figures credited West Texas with 68 crews, Southeast Texas with 35, Southwest Texas with 30, and East Texas with 14.

An easy second in activity was Louisiana, where 80 crews were busy, compared with 76 the year before.

Interest in New Mexico's formations is mirrored in its jump from 20 crews afield in 1949 to 34 in 1950. Next on the list is Oklahoma, which sagged to 26 from an active 35 the year before.

Geophysical and Core Drilling Activity at End of 1950 and 1949

(Figures represent number of crews. Data for 1949 as of December 31; for 1950, as of November 30. Source: Interstate Oil Compact Commission.)

	GEOPHYSICAL CREWS								CORE DRILL CREWS		Total Geophysical and Core Drill	
	Seismic		Gravity		Magnetometer		Total Geophysical					
STATE	1950	1949	1950	1949	1950	1949	1950	1949	1950	1949	1950	1949
Alabama	4	1	1	..	1	..	6	1	..	..	6	1
Arkansas	8	7	..	2	..	1	8	10	..	..	8	10
California	18	14	3	2	..	1	21	17	..	..	21	17
Colorado	16	7	3	2	..	..	19	9	..	..	19	9
Florida	..	..	1	1	..	..	1	1	..	..	1	1
Georgia	..	..	..	..	..	..	..	..	..	..	..	..
Illinois	4	5	4*	2	..	..	8*	7	2	1	10	8
Indiana	5	6	..	..	..	..	5	6	..	..	5	6
Kansas	9	6	1	1	..	..	10	7	4	4	14	11
Louisiana (North)	14	16	2	5	1	..	17	21	1	1	18	22
Louisiana (South)	54	47	7	7	..	..	61	54	1	..	62	54
Michigan	..	..	..	..	..	..	..	..	6	5	6	5
Mississippi	16	21	1	4	..	1	17	26	2	5	19	31
Montana	12	16	..	5	..	..	12	21	..	..	12	21
Nebraska	11	5	..	..	..	..	11	5	..	..	11	5
New Mexico	31	17	2	2	..	..	33	19	1	1	34	20
New York	..	..	..	..	..	..	..	..	..	..	..	..
North Dakota	7	5	1	2	..	1	8	8	..	..	8	8
Oklahoma	25	33	1	2	..	..	26	35	..	..	26	35
South Dakota	4	..	1	..	..	..	5	..	..	..	5	..
Texas (East)	10	7	..	5	..	..	10	12	2	2	12	14
Texas (Southeast)	41	32	7	3	..	..	48	35	..	..	48	35
Texas (Southwest)	32	25	3	4	..	..	35	29	2	1	37	30
Texas (West)	67	62	10	5	..	1	77	68	..	..	77	68
Utah	5	4	..	2	..	2	5	8	..	..	5	8
Wyoming	22	29	..	4	..	..	22	33	..	..	22	33
TOTAL	415	365	48*	60	2	7	465*	432	21	20	486	452

* Includes one soil analysis crew.

Emphasizes Deep Drilling

West Texas Play Shifting To Midland-Upton Basin

Developments and leasing play during 1950 point to a shift in West Texas activity during 1951 from the east side of the Permian Basin to the Midland-Upton Basin proper and its east flank.

Emphasis on the east side of the Permian Basin began in 1949 with the discovery of Canyon Reef lime production in Scurry County, mushrooming during 1950 into the greatest drilling program ever enjoyed by West Texas. However, as the year drew to a close the trend was developing toward the Midland-Upton Basin, especially its east flank, with leasing and wildcatting extending from Crockett County on the south to Hockley and Lubbock counties on the north.

Lying in the trend are Midland, Upton, Reagan, Glasscock, Howard, Borden, Martin, Dawson, Lynn, Hockley and Lubbock counties.

But while the trend was shifting to the west, Scurry and adjacent counties continued dominating factors in the 1950 development. Perhaps the most important of the discoveries resulting from the Pennsylvanian play which began with the reef lime discovery in Scurry was the Salt Creek pool of central Kent County.

The discovery was completed in April as the Caroline Hunt Trust Estate J. W. Young 1, situated 7½ miles northwest of Clairemont and north of the Cogdell field, lying across the Kent-Scurry line, a late 1949 discovery.

The discovery well was completed in the 6500-foot level for 2184 barrels of 39.2 gravity oil daily.

The Ellenburger discovery, immediately east of the Garza County, was the Star Oil Company et al Blanche Young 1, designated as the North Polar pool. Completed for 1476.72 barrels of 41.2 gravity oil daily from the 7800-foot level, it gives promise of being a better Ellenburger area than that opened several years ago by Humble Oil & Refining Company to the south and east, designated as the Polar pool.

Borden and Howard counties also shared in the discoveries mushrooming off the Scurry Canyon Reef play. Among the discoveries in Borden were the Reinecke, North Vealmoor, East Vealmoor and Canning pools. The top two were the Reinecke and East Vealmoor pool, with both Canyon Reef and Wolfcamp lime production being developed in the latter.

The Reinecke discovery was the George P. Livermore, Inc., Reinecke 1, completed for 5492 barrels of 46 gravity oil daily in the 6800-foot level. Sunray Oil Corporation got the first well at East Vealmoor, its Wilson 1, which rated a potential of 1604 barrels of 45.9 gravity oil daily in the 7500-foot level. This pool was extended south into Howard, where the Wolfcamp production was developed.

The heavy drilling play in Scurry led to the merging of three of its Canyon Reef pools — Kelly - Snyder, Diamond M and Sharon Ridge—into a common reservoir classification by the Texas Railroad Commission.

There were no new discoveries in the county from the Canyon Reef. San Andres production was found in the Diamond M pool, with pay in the 2900-3100-foot levels uncovered in the Sharon Ridge district. Production from the Caddo also was found in the Kelly-Snyder pool, coming at Sun Oil Company et al's Mae Lemons 2, completed in the 7600-foot horizon for 110.4 barrels of oil daily.

Strawn production also came on the southeast side of the eastern part of the Kelly-Snyder pool and designated as the North Snyder (Strawn) C zone. Development continues in this horizon, as in the others uncovered during the year in Scurry, except the small Ellenburger well found in the western part of the country by the Delta Gulf Drilling Company et al H. H. Eiland 1.

Discoveries in Hockley, Lynn, Dawson, Martin, Terry, Midland and Upton counties during 1950 presaged the trend toward the Midland-Upton Basin. Oil was found in horizons ranging from lower Permian to the Ellenburger, with the Spraberry sand and shale section of the lower Permian being one of the dominating factors.

Most northern of the discoveries in this trend was the West Anton pool in northern Hockley. The discovery was Humble's J. J. Hobgood 1, eight miles northeast of the Yellowhouse San Andres pool. The pool opener was completed from the Fullerton lime section of the Clear Fork, a Permian member, for 77.34 barrels of oil and 63.38 barrels of water daily at 6665 to 6675 feet.

However, this was not the first nor most important of the Hockley discoveries. The most important and the one which set off a trend which has spread eastward into western Lubbock County was the Honolulu Oil Corporation and Signal Oil & Gas Company Underwood 1-13, completed for 2236 barrels of 42.1 gravity oil daily at 9290-315 feet from the Canyon Reef.

Expansion continues in all directions, except the north, defined by a dry hole.

Moving south into Terry and Lynn counties, the trend uncovered the first production in the latter. It came in the southeastern part of the county at the Magnolia Petroleum Company Garza Land & Cattle Company 1, 3½ miles southeast of the little town of Draw. It was completed from the Pennsylvanian lime for 244.61 barrels of 42.2 gravity oil daily in the 8600-foot level. However, subsequent drilling to this horizon proved disappointing, but did find Mississippian production at Humble's W. C. Dulin 1, northwest offset to the Pennsylvanian discovery. It was a pumping well in the 9000-foot level for 134.57 barrels

of 34.8 gravity oil and 16.63 barrels of water.

However, the presence of the two producing horizons spurred a leasing play in the county, which points to further drilling in 1951.

To the west, in Terry County, the searchers for oil were more fortunate, finding Canyon Reef and Wolfcamp production. The first came in January from the Pennsylvanian at the Tide Water Associated Oil Company J. P. Nystel 1, good for 1152.76 barrels of 35.5 gravity oil daily from 11,475-542 feet.

This set off the play in Terry, unabated at the close of the year, that resulted in the Wellman Canyon Reef pool in July, and the South Brownfield Canyon Reef and Adair Wolfcamp pools in September.

More wildcatting and leasing probably resulted from the South Brownfield pool, opened by Union Oil Company Laura A. Cotten 1, than any other. It rated 1812 barrels of 44.1 gravity oil daily from the 10,000-foot level.

However, steady drilling has expanded both the Wellman and Adair pools. The former was opened by Anderson-Prichard Oil Corporation H. C. Bevers 1, a 2280-barrel well at 9700-800 feet, and the latter by Amerada Petroleum Corporation N. W. Willard 2, a 912.29-barrel discovery in the 8500-foot level.

Effect of the Spraberry development was reflected in Dawson County, where the first production from the horizon was found several years ago. Two pools were opened during 1950 to set off a play which will continue in 1951.

Both Ellenburger and Devonian production developed in Martin County from the Midland-Upton Basin trend play, but the former was exhausted and the well finally completed from the latter zone. The discovery was The Texas Company State 1-X, completed in the 12,000-13,000-foot horizon for 390 barrels of oil daily.

Greatest impetus to the search for Spraberry production, which will be the objective of the campaign among independent oil men in 1951, came in Midland County. There were two new discoveries from the horizon in eastern Midland—Germania and Midkiff pools—but the expansion of the Tex-Harvey pool, a 1949 discovery, into a sizable area was the most important factor. At the start of the year, there were 29 drilling rigs in the area, which is 3½ miles wide and 3¼ miles long.

It rapidly is being extended east and is expected to join with an area opened in western Glasscock County by the Hubbard S. Russell Wrage-Hendrickson 1.

Production on the west side of Midland was from deeper horizons, ranging from the Wolfcamp to the Ellenburger. Among the Ellenburger discoveries were the Parks and Sweetie Peck pools, with Wolfcamp, Pennsylvanian and Silurian production also developed in the latter area. The first well was the General American Oil Company Josie Faye Peck 1-E. Magnolia Parks 2 found the Parks pool, a 611.44-barrel well from 12,944-70 feet.

Upton and Reagan counties came into the trend play in the Midland-Upton Basin through developments near the close of the year. Activity in the latter will result from the four drilling blocks sold at the December auction of leases on University of Texas lands.

New Mexico Play Centers On Lea, Chaves Counties

Continued search for deep production in northern Lea County and extending into Chaves County is expected in 1951 as the result of discoveries during the past year.

The play that started in Chaves with the discovery of Devonian production in May, 1950, at the Magnolia Petroleum Company Lightcap Land Company 1, 6-8s-30e, 35 miles southeast of Roswell and the same distance northwest of production from the same horizon in northwestern Lea County, was continuing at the end of the year.

Subsequent drilling around this discovery proved disappointing, but expanding activity led to success again in December at the Magnolia C. L. O'Brien 1-b, 1-9s-28e, nine miles southwest of the Lightcap pool. It was a 270-barrel well in the 7250-foot horizon, higher structurally than the Lightcap pool opener, completed in the 7900-foot horizon for 492 barrels daily.

Another 1950 success in Chaves was Honolulu Oil Corporation State 1, 17 miles southeast of Roswell in 13-11s-27e, completed for 170 barrels of oil at 6500 feet.

Successes of 1950 in northern Lea included the Gulf Oil Corporation Saunders 1, 34-14s-33e, a Pennsylvanian discovery at 9900 feet. Exploration, continued in the area, is expected to expand in 1951.

McAlester Fuel Company set off a play in the northern half of Lea with Brownfield 1-A, 30 miles north and east of Lovington, and in 24-12s-37e, 15 miles north of the Denton multi-pay pool, a 1949 discovery.

Completed from the Devonian, the McAlester success also flowed from the Wolfcamp and Pennsylvanian, which will spur further drilling in 1951.

Shift to Western Edge of Texas Panhandle Likely

Shifting of activity from the Anadarko Basin to the western edge of the Panhandle is indicated for 1951 through the extensive leasing play extending off the Midland-Upton Basin trend in West Texas.

Except for a small Pennsylvanian oil producer in Sherman County, on the west rim of the Anadarko Basin, results were disappointing in the Panhandle during last year. This well, Phillips Petroleum Company Willco 1, Sec. 15, Block 3-T, T&NO survey, rated 225 barrels of oil in the 5900-foot level. It is two miles south of the same firm's Kathryn 1, a Pennsylvanian gas discovery south of the Texas portion of the Hugoton gas field.

Finding of the Pennsylvanian Reef in Oldham County set off the leasing play along the west side of the Panhandle, with a test to the granite getting under way in the southwest corner of the county early in 1951. It is the George P. Livermore, Inc., Malcom Moser 1, 26-7n-1e. Results of this operation will go a long way toward determining the extent of drilling in that part of the Panhandle.

West Central Texas Feels Canyon Activity Effects

Effects of the Canyon Reef play along the east side of the Permian Basin were felt in West Central Texas during 1950, and will become more noticeable in 1951.

However, the old producing counties in North Central and West Central Texas had their share of successes through wildcatting in 1950 and the 1951 picture isn't expected to be any different. An example is the East Hamlin pool in Jones County, seven miles east of Hamlin.

Sohio Petroleum Company Whaley 1, Sec. 65, SP survey, set the play in motion when it completed for 320 barrels of oil daily from the Swastika sand at 3136-46 feet. By the end of the year, 38 producers had been completed in the area, with increased drilling due in 1951 because of the shallow depth.

Also sharing in the shallow play is

the Jackson pool in southeastern Stephens County, where production is found around 1750 feet in the Strawn sand. The Hydrafrac process has proved valuable in this area, with small wells initially completed for around 200 barrels daily. There hasn't been a dry hole in the expanding area, where the wells now exceed 20.

The Bankline-Owens pool, between Eastland and Cisco, is another shallow area benefitting from Hydrafrac. Production there is from the Lake sand, opened by Bankline Oil Company Briggs-Owens 1. Another shallow area for West Central Texas, where development is expanding, is the Courtney pool, four miles northwest of Eastland, a Strawn area in the 1600-foot horizon.

Sharing in the deep play, extending off the Scurry development, along the west side of West Central Texas are Stonewall, Fisher and Nolan counties.

Some of the earliest Canyon Reef exploration in West Central Texas was carried on in Stonewall, which received its first discovery from the horizon late in 1950 at the Seaboard Oil Company W. F. Edwards Estate 1. It was a 222-barrel well at 5215-338 feet.

However, the Stonewall play started with the finding of conglomerate Bend production by the C. L. Norsworthy, Jr., Wiley 1, 12 miles northeast of Aspermont.

Four miles south, Roark, Hooker & A. G. Hill C. L. Williams 1 uncovered additional conglomerate production, while Deep Rock Oil Corporation C. B. Long 1, seven miles north and west of the former discovery, found Strawn production at 5124-34 feet.

A Swastika discovery was the Moutray-Moore Drilling Company W. J. Bryan 2, 12 miles southeast of Aspermont.

Fisher received discoveries from the Ellenburger, Strawn and Mississippian, setting off plays that will continue well into 1951. The same is true of Ellenburger production in Nolan County, where pools also were opened from the lower Fry, Strawn and Canyon sands.

North Texas Has Ordovician Play in Grayson County

Overshadowing the usual large number of discoveries in North Texas last year was the opening of prolific production in two horizons of the Ordovician in northwestern Grayson County, south and east of Sandusky.

A leasing play spread off the discoveries south into Collin County and east into Fannin County, a prelude to a search for the Ordovician production in these counties during 1951.

The Texas Company set the Sandusky play in motion early in 1950 with completion of Marshall 1, A. Tuttle survey, south of Sandusky, to flow 105.5 barrels of 44.5 gravity oil daily from the Ellenburger, lower Ordovician, between 7848-85 feet.

Later in the year, production was found in the Oil Creek sand of the Simpson, middle Ordovician, by the L. O. McMillan Chambers 1, W. D. Fisher survey, completed to flow 396 barrels of oil in the 7200-foot level.

Existing East Texas Areas To Be Broadened in 1951

Broadening of existing areas, as was the case in 1950, will be the pattern of exploration in East Texas this year. There is the possibility of a few Smackover tests in the basin and some new drilling in the south end of the district in Houston and Madison counties.

Most important of the 1950 expansion programs was in the Woodlawn section of Harrison County, a rich gas-distillate area producing from the Pettit in the 6400-foot level. It was extended north, south and west, with a dry hole defining producing limits on the east.

The drilling was more accelerated in the Pewitt Ranch area of Titus County, a Paluxy sand pool at 4500 feet. There were only four wells in the pool at the start of 1950, and 45 at the close of the year, with operators still pushing development.

The Tennessee Colony pool in southern Anderson County and Trawick gas field in Nacogdoches County also were broadened during 1950.

Quest for Deep Production Is Trend in South Texas

The search for deeper production, especially in the Frio sand sector of the Corpus Christi district, is the trend in South Texas.

This search bore much fruit during 1950 and further exploration is assured in 1951. Areas where shallow Frio sand dry holes had been drilled yielded production in 1950 when the Frio formation was penetrated deeper.

This was especially true in San Patricio County where The Superior Oil Company developed one of South Texas' most prolific Frio sand fields.

At the end of the year, Superior had 20 producing wells in the Portilla field and as yet the field has not been defined by a dry hole. Because of favorable reservoir conditions, the area is termed the "perfect" field. Production is found from 7500 to slightly below 8000 feet.

Furthermore, the Frio sand trend in Aransas and Nueces counties has yielded oil and gas reserves from 9000 to 10,500 feet.

New Frio sand production also was discovered in Jackson and Victoria counties. The Swan Lake field, Jackson County, developed by Southern Minerals Corporation, first yielded dual gas sands at 6000 and 6800 feet. A dry hole followed, but the third well was completed as an oil producer. The field now has 15 wells flowing from five oil and two gas reservoirs.

In Victoria County, new sands were developed at East McFaddin, Minniter, and the old Victoria fields.

The Wilcox sand trend also gained impetus through new strikes by Shell Oil Company in DeWitt County and by Hugh Kirkpatrick in Goliad County. Further exploration along this trend will be made in 1951.

South Texas is noted for its shallow oil and gas production, and this activity was not neglected during 1950.

Major discoveries were made in Frio and Duval counties and the shallow Serpentine plugs in Travis and adjoining counties yielded a few new strikes. These new finds will be further explored in 1951.

Salt Domes Get Attention On Gulf Coast of Texas

Salt domes, explored for 50 years on the Texas Gulf Coast, once again are receiving much attention, and the successful ventures on the flanks of these old domes assure considerable development in 1951.

The current cycle of salt dome drilling began just after World War II and reached an unexpected high in 1950. New oil reserves found around these domes was the maior development on the Texas Gulf Coast during 1950.

In their desire to fully explore all possibilities of these domes, operators in 1950 found new oil production at South Liberty, Hull, Moss Bluff, Esperson, and North Dayton, in Liberty County; Batson, Sour Lake and Kountze, in Hardin County, High Island in Galveston County; Spindletop and Big Hill in Jefferson County; Pierce Junction and Cedar Bayou in Harris County, and Orange in Orange County.

Major geological development in

the domal drilling was the discovery of production on the north flanks of some domes, especially at Big Hill, South Liberty and Hull. Heretofore, the north flanks of these old domes have failed to yield much production.

Oilmen also say that because of pipe shortages, the comparatively shallow depths yielding oil on the flanks of these domes makes the drilling venture attractive.

The eastern section of the Texas Gulf Coast, bordering the Sabine River, was the site of much development in 1950 and this activity will be continued during 1951.

A major oil discovery during 1950 was the Rose City field in Orange County. The discovery well was drilled by John Mecom of Houston. Activity in this field by other operators is expected in 1951.

Southern Newton County also witness its most active wildcat campaign during 1950 and because of new gas and condensate strikes, the area will continue active in 1951.

Major gas reserves were developed in 1950 in Jefferson, Orange and Newton counties, on the east side of the Gulf Coast, while Wharton, Colorado and Austin counties were sites of new gas fields on the western sector.

The Wilcox sand trend on the northern side of the coast was liberally explored during 1950 with new discoveries leading to vast leasing programs.

The big discovery was five miles north of Chapel Hill in Washington County by Jake Hamon and Edwin Cox of Dallas. A confirmation test now is being drilled by the operators and two other Wilcox sand wildcat tests are drilling in the Brenham area. The old Brenham dome also is expected to see new exploration in 1951.

Steady Development Due In Southern Louisiana

The southern and coastal areas of Louisiana are expected to maintain a steady wildcatting and development program during 1951, pretty well paralleling that of 1950. Increasing needs for crude oils and the indicated increase in the price of gas will possibly offset an indicated continuation of the shortage of tubular goods.

Earnest development of proved areas while new discoveries stayed below normal marked the trend of activity during 1950.

Although some new pays were opened in the Ship Shoal sector of the tidelands, off St. Mary Parish, only routine drilling occurred on Louisiana's continental shelf. However, preparations are being made to fully develop the gas reserves off Cameron Parish. A pipe line company has been formed to gather the gas about 25 miles off shore, with the residue gas, after stripping, earmarked for a transcontinental pipe line system. This will mark the first development of gas reserves in tidal waters. One of the most important discoveries in South Louisiana during the past year was the Romere Pass field of Plaquemines Parish. It was discovered by The California Company at its North Main Pass Unit 1, 22-20s-19e, which produces 32.0 gravity oil from the 9000-foot level. By the end of the year, California, sole operator in the field up to that time, had completed 16 producing oil wells and no dry holes.

Another of the especially significant oil discoveries in 1950 was that of The Ohio Oil Company in the Phoenix Lake area of Calcasieu Parish, just across the state line from Orange County, Texas. The field now has six oil producers, no dry holes, and two sands have been uncovered. The oil is from the Frio sand at comparatively shallow levels of between 8000 and 9000 feet. As a result of this discovery, new wildcat development is scheduled along this trend in 1951.

Efforts continued to find new deep production in the Basal Miocene formation. However, the deep production was moved westward, with Magnolia Petroleum Company finding a commercial flow below 14,000 feet in a test at Hurricane Creek in Beauregard Parish.

Also, in Calcasieu Parish, Sun Oil Company found high pressure production in a wildcat on the north flank of the old Vinton Dome. This strike could start a new campaign for similar production on the flanks of other known salt domes.

A sharp spurt in drilling was noted on the Wilcox sand trend in Rapides, Avoyelles and Pointe Coupee parishes.

North Louisiana Activity To Be Widely Scattered

Indications as 1950 came to a close were that exploration and development drilling in north and central Louisiana for the coming year will be widely scattered.

In the northwestern parishes, around and on the Sabine Uplift, Woodbine, Pettit and Paluxy exploration gave every indication of continuing steadily into 1951, with development in these shallow pays following the same pattern laid down during the last part of 1950.

Northern parishes will no doubt receive considerable attention for Smackover lime and Cotton Valley prospects with some highly touted spreads coming under the bit during 1951. Leading to this belief was T. L. James Company's recent start at King 1, 29-22n-5w, on the Antioch Prospect of Claiborne Parish. Smackover and Cotton Valley development in old fields continued briskly in the final months of 1950 and will probably do so on into 1951.

Extending along the Wilcox trend of central Louisiana and the southwestern Mississippi districts, 1950 exploratory successes should accelerate leasing, wildcatting and development. Most important finds of 1950 in this area were seemingly the Fairview field of Concordia Parish, discovered by Sinclair Oil & Gas Company, R. B. Sharp et al 1, 10-4n-9e, in the late days of November, and the Glenmora field of Rapides Parish, discovered by Texas Pacific Coal and Oil Company earlier in the year. The discovery well of the Fairview field, which is on the eastern side of the trend, had a possible total of 70 feet of saturated Wilcox oil sands according to electric log, while the discovery well of the Glenmora field, Texas Pacific Coal's Elliott 1, 35-1s-2w, farther west in the deeper part of the trend, logged a reported 137 feet of effective sand in the basal Wilcox. This discovery is unique in that it penetrated approximately 2200 feet of Wilcox before finding pay.

Smackover to Have Big Part In Arkansas' 1951 Activity

Headlining a probably highly exploratory drilling program in Arkansas in 1951 may be Smackover lime wildcatting and development, based on activity in the latter days of 1950.

Continuing to pace activity will be Columbia, Ouachita and Union counties in the south central part of the area. At year's end, locations were staked for two Smackover lime wildcats in Columbia County, while another operator in Union County was virtually assured production from the Smackover at a deep test in an old producing field.

Smackover lime discoveries during 1950 were at Catesville, East Warnock Springs and Tubal fields, with two of the fields now having some wells dually completed from the Smackover and the Cotton Valley formations.

Also in the south central sector, a

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They ran into soft clay and loose gravel formations 30 to 50 feet thick while drilling 90-foot holes. This means really tough drilling because drag bits can't break up the gravel, and rock bits ball up with the soft clay.

Hawthorne "Blue Demon" Rock Cutter Bits drilled through far faster, and the hole was far cleaner and straighter than normally obtained with other bits. Notice in the picture how much gravel was broken up by the Hawthorne Bits.

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P. O. BOX 7366, HOUSTON 8, TEXAS

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pair of new Travis Peak discoveries completed during 1950 will add to activity, being especially enhancing due to the shallowness of this sand series in the Union-Columbia-Ouachita County area.

In the southwestern portion of the state, discovery of Fort Lynn field by Stanolind Oil & Gas Company's Miller Land and Lumber Company 1, 20-18s-28w, a Rodessa oiler, will probably draw considerable attention and development.

Interest Shifts to Deeper Prospects in Mississippi

The old year saw a waning of Wilcox exploration in southwestern Mississippi with interest swinging toward deep exploration in the central counties of the state, where it may stay if either of three currently drilling wildcats prove successful. These three ventures are all in quest of production from the Smackover lime, believed by some geologists and operators to hold productive possibilities in this sector of the state.

Probably the most important discovery of the year was the Kingston field of Adams County, a Wilcox pool. However, the discovery of oil at a marginal producer in the old Pickens field of Yazoo County heightened interest in early 1950 by opening production from a sand body of the Lower Glen Rose formation. Discovery of this pay was the direct cause of the drilling of numerous exploratory failures in the area closely surrounding the new strike.

This find also touched off a leasing play rivaled only by the Tinsley boom of the early 1940's. The play was short-lived due to the poor showing of the discovery, but during its early days thousands of acres were blanketed by interested operators.

Drilling programs in the southeastern counties are expected to parallel those of the preceding year. In this area, possibly the most important find during the year past was that of Eutaw production in the Ovett field area of Jones County. However, due to the low gravity of the crude, returns from this production may not be sufficient to offset the drilling costs and the scarce tubular goods required for field development.

In the southwestern counties of Mississippi, Lower Tuscaloosa wildcatting may gain some importance. Cause for this belief is Humble Oil & Refining Company's near discovery at W. A. Stockard et al 1, 33-1n-6e, Amite County.

Oklahoma Field Operations At Record Levels in 1950

Field operations in Oklahoma during 1950 reached record levels. Persistent drilling efforts of state operators broadened out the vast Velma region in Stephens County, and with the discovery of new pools off the eastern flank, promised an eventual tie-up with production in Carter County.

Interesting discovery wells in Love and Jefferson counties opened new vistas of geological exploration for the southern regions.

As in 1949, the Elk City field in Beckham and Washita counties received the most expansion. The potential of this field is a long way from being defined. There are now 98 producers knocking out a state allowable of around 17,000 barrels per day. Flank wells, particularly on the west side, have extended the field into another township.

Another heavy development area is in the Ringwood field of Major County, where 138 producers are now hitting an allowable of 7050 barrels a day. The production trend of this field is to the south and west.

During the past 12 months, several deep exploratory tests have been drilled in the western part of the state. Though important from a geological standpoint, no commercial pay has so far been encountered. In Ellis County, Sunray Oil Corporation drilled the year's deepest test at Hanan 1, C SE NW 1-19n-24w. This venture hit 15,047 feet before being abandoned. Farther north and in the same county, Sinclair Oil & Gas Company's Berry 1, C SE NW 14-24n-25w, was plugged after being drilled to 11,252 feet in the Arbuckle.

In Washita County, Stanolind Oil & Gas Company drilled a deep duster at Slatten 1, C NW NW 13-9n-18w, about three miles southwest of Cordell. The hole was carried to 11,300 feet.

Perhaps the outstanding strike for the western area is The Carter Oil Company's State-Taylor 1, in C SW SW 31-9n-21w. This well, which is eight miles south of the Elk City field, encountered commercial pay during a drill-stem test between 2951 and 3005 feet.

Some of the key discovery wells for Oklahoma during the year include V. A. Brill's Riordan 1, which opened the Roulette Creek pool in Cleveland County. This Wilcox producer had the second sand between 6420-27 feet, and was completed flowing 346 barrels of oil daily. Location SE SE NE 16-8n-1e.

In McClain County, Greenbriar Oil Company hit the Bromide between 10,690 and 10,726 feet for a flow gauge of 333 barrels of oil daily to open the North Washington pool. The Wentzell 1 is in NE NW NW 33-8n-3w.

The Peters Petroleum Company struck Red Fork pay at 2529 feet to open the East Paxton pool. The company's Daniels 1, in E½ SE NW 7-22n-8e, flowed 240 barrels of oil in 24 hours for completion. This was one of the major strikes for the Osage country for the year.

Emphasis on Exploration Due for Kansas in 1951

Kansas operators opened about 125 new oil and gas pools during 1950. Development of the Nemaha Uplift in Wabaunsee County, which was opened up in 1949 by The Carter Oil Company, continued at a slower rate than was expected at the time of the Davis Ranch strike.

The northwestern regions received a brisk play by Kansas operators, with Rooks, Ellis, Russell, and Graham counties holding dominant roles.

In the southeastern corner of the state, water-flooding has revived old areas in Chautauqua, Montgomery, and Labette counties.

Exploratory drilling in Barton County proceeded at a brisk clip. E. H. Adair opened the Red Wing pool with Everleigh 1, SE SE SE 31-17-12, located about 3½ miles east of the McCauley pool.

Trego County got a discovery with the opening of production three miles northwest of Nicholson. Peel and Hardman's Walz 1, SE SE SW 12-11-21, hit the Arbuckle at 3665 feet, set casing, and drilled in to 3680 feet and was finaled flowing 10 barrels of oil per hour.

The Pundsack area in Stafford County received active development during the year, receiving extensions to the north and northwest.

In northern Phillips County, the Huffstutter pool, discovered late in 1949, was extended more than two miles on a northeast-southwest trend, and also to the northwest.

In Meade County, on the eastern side of the vast Hugoton gas field, Columbian Carbon Company and United Producing Company indicated commercial oil pay at Novinger 1, in C NW NW 26-33-30.

In the Forest City Basin of northeastern Kansas, Carter indicated a new field at Woodbury 1, SE SW NE 11-15-10e, eight miles southeast of the

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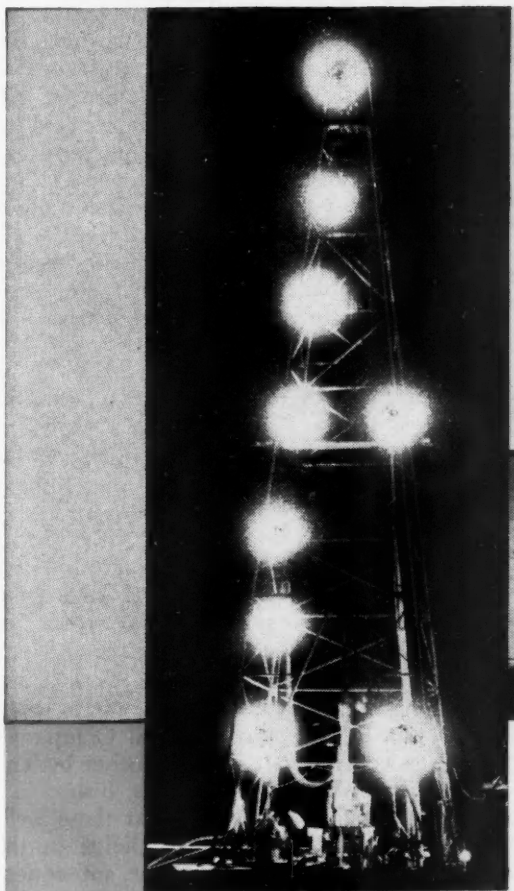

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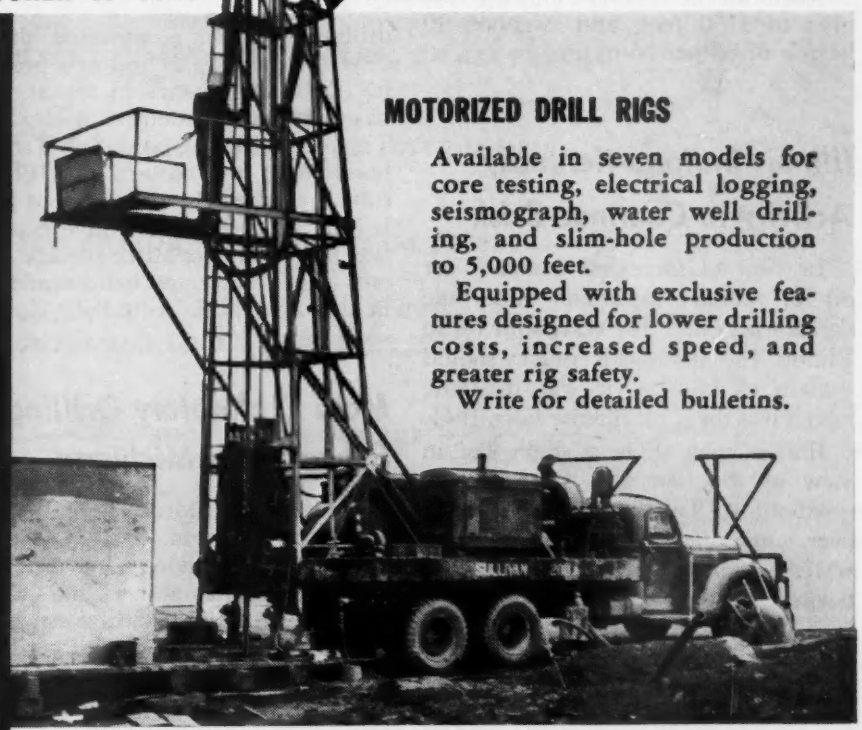

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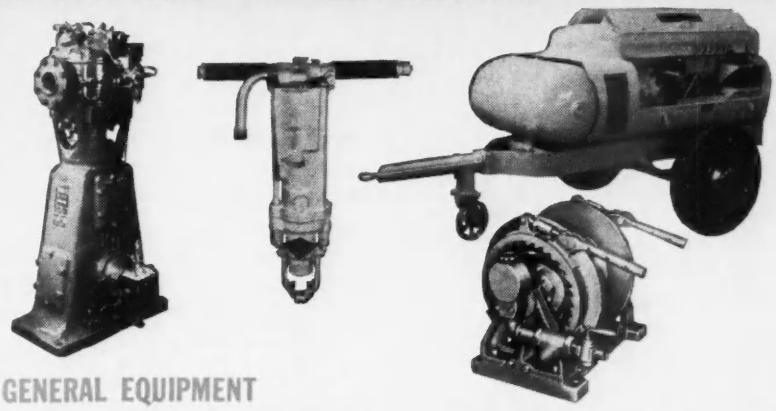

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Davis Ranch pool in Wabaunsee County. Top of the Simpson was called at 3262 feet, and during a two-hour test at 3277-93 feet, recovery netted 320 feet of oil and 45 feet of heavily oil-cut mud.

In the northeast, Carter opened Sabetha field with Orean Strahm 1, NW SW NW 13-2-14e. Located three miles northeast of the Strahm pool, the discovery well was given a potential of 319 barrels per day from the Hunton.

Imperial Petroleum Company hit Lansing pay about 1½ miles south of the Dayton pool in Phillips County. Vogel 1, in SE SE NE 14-3-19, topped the Lansing at 3128 feet, drilled out plug to 3150 feet, and swabbed 20 barrels of oil per hour.

Illinois-Indiana-Kentucky Activity to Continue Brisk

In view of increased demands for oil for military expansion under the defense program, the search for oil in Illinois, Indiana and Kentucky should remain as high as it was in 1950, which was the most intense since 1941.

Illinois may show a slight lag in view of the fact that failures were greater for 1950 than in 1949. However, some operators feel that drilling will increase despite this apparent hazard.

Illinois

While Illinois' wildcat discoveries were equal in 1950 to 1949 the rate of failures increased. At the same time, Illinois production showed a slight decline, and oil men anticipate another production decline in the current year.

Illinois' most outstanding developments for 1950 were revival of the Ingraham pool (4n-8e) in Clay County; discovery of the Flanningan pool (6s-5e) and the South Cantrell pool (7s-5e) in Hamilton County; and the discovery of the West Ellery pool (2s-9e) in Wayne County.

Indiana

Indiana is practically certain to see another increase in exploration activities. Outstanding developments last year were discoveries of the Plainville pool (4n-7w) in Daviess County; the Claybank pool (3s-8w) in Pipe County; the South Ford pool (6s-12w) in Posey County; and the Fairbanks pool (9n-10w) in Sullivan County.

Kentucky

Kentucky had an increase in well completions for 1950 over 1949 and also recorded a production increase. The same is likely to occur this year. The outstanding discoveries in Kentucky during 1950 were the Zion pool (P-25) in Henderson County and the extension and expansion of the Morganfield south pool (N & O-19) in Union County.

Ohio Expects New Decline In Exploratory Drilling

A further decline in exploratory drilling in Ohio is expected during 1951. The failure to find new producing areas of any size in recent years has discouraged extensive wildcatting. The deep Clinton and Sub-Trenton horizons in the eastern part of the state are relatively untested, but there is little prospect of extensive exploration unless a major strike is made. The only Sub-Trenton test being made now in this area is in Ashtabula County.

More Exploratory Drilling Expected for Michigan

Under-lease wildcat acreage was increased slightly in 1950, geological mapping by shallow core tests and other means was active; and Michigan closed the year with reserves and production potential declining. These factors combined are expected to influence a relatively high rate of exploratory development in 1951.

What the defense program does to the pipe supply will bear heavily on Michigan operations. Used pipe is shorter in the state now than during the bottom of the World War II period.

Exploration this year should follow about the same pattern as in 1950 with biggest concentration on northwestern Michigan where a number of attractive shallow pools have been found in the last four years.

Intensfied Wildcatting Expected for California

A greatly intensified wildcatting campaign is in prospect for California in 1951.

This stepping up of the exploratory effort will follow a year in which wildcatting, while relatively heavy in number of wells, produced nothing that could even remotely be called a major discovery.

Possibly part of the miserable showing for 1950 can be attributed to the unhealthy situation surrounding heavy oil in the first half of the year. Low prices and lack of markets tended to guide the energies of wildcatters toward high gravity prospects almost to the exclusion of the heavy oil districts. In the second half of the year both prices and markets for heavy oil improved and this is just now being reflected in the exploratory undertakings.

Some idea of the degree of change in marketing conditions may be had by the fact that at the end of 1949 there were shut in 3000 heavy oil wells in California with a daily potential of 80,000 barrels. At the end of 1950, by comparison, there were 250 wells shut in with a daily capacity of 14,000 barrels. It is significant that the wells remaining shut in are for the most part producers of extremely heavy and high sulfur crudes.

However, now that the sub-normal marketing conditions have been corrected, the search for new reserves is building up. It is estimated that the wildcatting activity in 1951 will be from 20 to 40 percent greater than in 1950.

Possibly the most important find for 1950 was the discovery of the Hibberd sand by Richfield Oil Corporation in the South Cuyama field. This 80-foot thick horizon has only been found productive in one well, but there is some thought that it may extend over a fair portion of the field.

Two other discoveries were made in the Cuyama Valley during the year, one by The Superior Oil Company's Government 18 and the other by The Hancock Oil Company's Bishop 55. At first it was hoped that these wells had opened up major fields in the Cuyama Valley. However, subsequent work appears to have reduced them both to small isolated pools.

In the Los Angeles area two discoveries were also made, one by Humble Oil & Refining Company and one by The Texas Company. Both still have a chance of being of some significance.

A good pool was found by D. K. Associates and labeled the Tunis Creek field. The discovery flowed 479 barrels daily of 33 gravity oil from only 1300 feet. Five more wells have since been drilled and are substantial producers. Apparently the accumulations are small fault blocks.

Development drilling in California is expected at about the same pace as 1950, barring unforeseen difficulties in obtaining steel.

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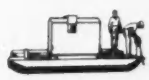
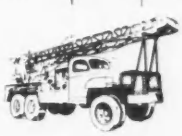
PONTOONED EQUIPMENT 

ELECTRIC SHOT HOLE LOGGERS

 CORE DRILLS

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California Outlet Assures Activity in San Juan Basin

The importance of the San Juan Basin of northwestern New Mexico and southwestern Colorado was increased as a gas producer in 1950. New pools were discovered, and of 47 development wells drilled, 98 percent were effective. Only two oil holes were drilled. Construction of a pipe line to California markets will keep drilling under way this year.

Utah's Uintah Basin Due For Exploratory Drilling

Both wildcat and development drilling dropped in Utah last year but despite disappointments, exploratory drilling is expected to continue this year, particularly in the Uintah Basin and in the southeast where outlets for gas production are planned.

Although a deep wildcat at Gusher in Uintah County was disappointing in small production last year, several companies continue prospecting.

Reserves of value because of marketing plans were indicated early in the year by a Byrd-Frost, Inc., wildcat in the Monticello area of San Juan County. The company estimated the gas flow at between 5 million and 10 million cubic feet daily. Application for a pipe line to transport gas from the area to Salt Lake City has been made to Utah Public Service Commission by Utah Natural Gas Company.

Expanded Exploration in Colorado Likely This Year

Wildcatting predominated in Colorado last year because of expansion of the Denver-Julesburg Basin in the northeast. Nearly 58 percent of the wildcats drilled through November were in the basin. New field and pay zone discoveries encouraged activity in that area, extending into western Nebraska and southeastern Wyoming, will have expanded exploration and drilling this year with the companies interested moving westward.

Of the 6 million acres of undeveloped Colorado land under lease late last year, 4 million were in the Denver-Julesburg Basin. The three northeastern counties — Sedgwick, Logan and Phillips — were 85 percent under lease. Seventy-five percent of Yuma County's total area was under lease. Leasing and development began moving westward to Weld County late in the year.

The British-American Oil Producing Company discovered a good pool in the Yenter area of the basin in Logan County. One of its extensions, completed late last year and now on pump, tested 769 barrels of oil in 14 hours from the J sand. The producer has a total depth of 5357 feet.

Idaho Wildcats Planned; Deep Test Below 12,500

Idaho wildcats were disappointing in 1950 but some wildcatting is planned for 1951 by the Cities Service Company and others. Early in the year, the Phillips Petroleum Company was drilling below 12,500 feet in the Juniper anticline of Oneida County. The well is the deepest ever drilled in Idaho.

Development in Wyoming Encouraged by Outlets

Development drilling in Wyoming, encouraged in the last half of 1950 by prospects of increased marketing outlets and demand, will continue to be expanded in 1951, and development and discovery successes will stimulate wildcatting.

Defense demands pushed Wyoming black oil production to maximum capacity late in the year and upped the output of all types of crude.

More than 8 million acres of undeveloped land—compared to 3,250,000 in 1945—were under lease in the state last year and there will be widespread geophysical, geological and drilling activity this year.

The greatest development and wildcatting activity will be in the northwestern Big Horn Basin and along the western and southern edges of the northeastern Powder River Basin. Both areas will be served by the pipe line to Illinois.

The northern fields in the Powder River Basin led the Rocky Mountain region in development drilling last year and new production was developed there and along the southern edge of the area. More development drilling and some wildcatting are under way in the area of the Sussex, North Meadow Creek and Meadow Creek fields of Johnson County.

Wildcat drilling away from the shoreline structures of the Powder River Basin again failed.

Interest in the southern Powder section has been spurred by completion of a dual producer by Ralph Lowe of Midland, Texas, R. A. Goodall of Ogallala, Neb., and Clark Seargeant of Los Angeles.

General Petroleum Company made an outstanding Big Horn Basin reserve discovery at its Slick Creek wildcat south of Worland in Washakie County and has two other wells under way in a development drilling program.

There will be new development drilling in the northern Big Horn Basin area where comparatively shallow drilling turned up a new field discovery at South Byron.

New Oil Pools Encourage Wildcatting in Nebraska

Western Nebraska underwent a leasing boom in 1950 because of Denver-Julesburg Basin developments and 6,115,000 acres of undeveloped land were under lease late in the year. By comparison, there were 600,000 acres under lease in 1945.

Wildcatting outranked development drilling last year and is expected to be greater this year as the productivity limits of the basin are extended. Considerable exploratory work is scheduled for the area.

Several new fields were established. The Ohio Oil Company, which drilled the discovery well at Gurley in Cheyenne County in 1949, has scheduled heavy basin activity. Ohio has two late gas discoveries. One in the West Sidney area of Cheyenne County was completed as a 5140-foot wildcat and gauged 8,800,000 cubic feet of gas a day. The other, in the Huntsman-Burley area of the same county, gauged 4,870,000 cubic feet of gas daily.

Two Firms Block Land for Exploration in Montana

Montana wildcats were disappointing in 1950, averaging only 6 percent successful, but the state was second in Rocky Mountain development drilling and wells of that type averaged 76 percent successful. Wildcatting was up only slightly over 1949 and other drilling declined.

A new pay zone, the Heath, was an important central Montana discovery in a wildcat completion in Rosebud County's Sumatra area.

A new pool gasser with an initial production of 8,100,000 cubic feet daily was completed by the Union Oil Company of California at Cut Bank in Glacier County.

North Dakota Lease Play Promises Basin Drilling

Despite dry holes, leasing continued in the Williston Basin of North Dakota and wildcats are scheduled this year by Phillips Petroleum Company, The Carter Oil Company, Stanolind Oil and Gas Company and The California Company.

DRILLING FORECAST

Is for 4 Percent More Wells

By ELTON STERRETT
Engineering Editor

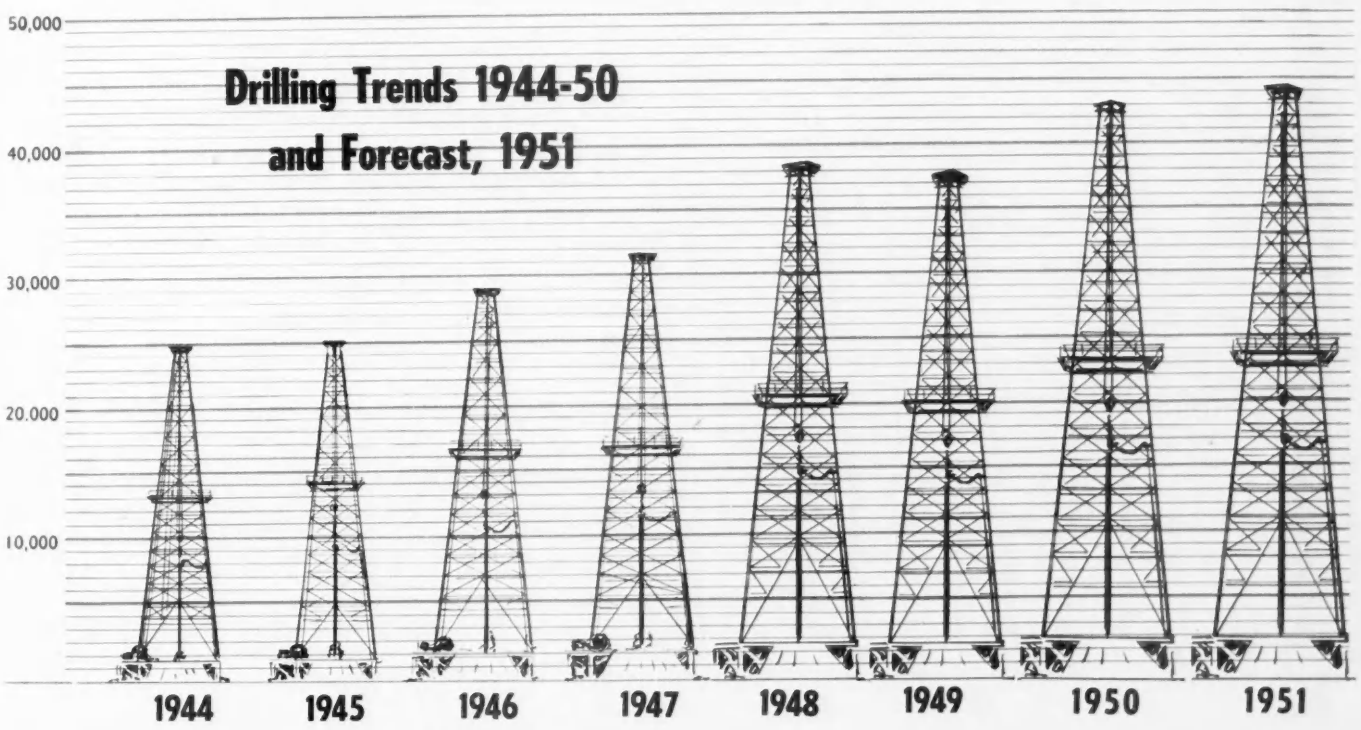
MORE wells, more wildcats, more footage than ever before. These are the three marks on which the drilling industry has set its sights for 1951. The 44,945 wells to be drilled exceed 1950's record total by more than 4 percent. The 8363 strict wildcats (excluding outposts and wells for deeper pays within fields) exceed the previous high by 7.5 percent, and the footage total of 170,556,000 feet estimated for 1951 will be more than 7 percent above 1950's high mark. Neither the estimated footage to be drilled nor the number of wells forecast includes any allowance for old wells drilled deeper.

This forecast, as were its predecessors over the past 18 years, is based on an annual survey by WORLD OIL in which individual forecasts of company drilling programs are obtained from among those organizations who drilled six or more wells in search of oil and/or gas during 1950. Regional engineers, geologists, heads of state regulatory bodies and consulting engineers submit forecasts for the areas under their immediate observation and these, together with correlative data on rigs operating, seismic and other prospecting, and type of probable product, all enter into the estimate as finally presented for each area in the tabulation.

Although our estimate for 1950 was low—as were all others—it most nearly pictured the 1950 drilling of any published forecast incorporating first-of-the-year data. This forecast should closely approximate 1951's drilling program; but, like any other covering a 12-month span of the future, it may be disrupted by such eventualities as shortage of tubular goods, difficulty of maintaining drilling crews in the face of stepped-up drafting of the younger men on the derrick floor, war demands for certain crudes, the curtailment of importations of crude through martial activity, or a national emergency which may dictate immediate open-flow of wells through lack of time in which to develop additional underground resources.

The number of wells to be drilled in each state or area listed includes all types of wells to be drilled within proven areas, including those seeking new pays or outposts seeking to extend production limits, all strict wildcats, and wells for the servicing of a lease or area, such as water-disposal and repressuring wells. Water wells, as such, are eliminated from the forecast.

Texas, estimated to drill 17,042 wells during 1951, will drill 43.9 percent of the United States total. The 1951 figure exceeds that for 1950 by 1.7 percent, though the footage anticipated will best last year's mark by 3.1 percent to reach a new high of 74,851,000 feet. Oklahoma, to drill 5403 wells against a recorded 5226, will be up 6.1 percent in footage to reach 20,129,000 feet. RR District 8 (West Texas) with 22,400,000 feet of hole scheduled, takes second place among



the subdivisions in the forecast, and leads all other Texas areas by a margin of nearly 11 million feet. (This though the area is one of a few to show a decline over the drilling recorded for 1950.)

Strictly on the percentage column, Tennessee and Maryland show as leaders, with development in the first problematical, while that in Maryland, though confined to the lowest corner of the extreme western edge of the state, can easily result in both wildcatting and development drilling in the tri-state area contiguous. Colorado, among the older producing states, shows for a 93.1 percent increase over 1950; Utah for 45.8—up to 35 wells from 24; Alabama up 44.4 percent, to drill 65 wells; Nebraska, whose forecast of 144 wells is up 34.6 percent from last year; Wyoming up 22.7 and Arkansas, up 22.2 percent, respectively, show for more than one-fifth increase in activity for the year, as does South Louisiana, to drill 1372 wells for an increase of 21.1 percent.

Of the 40 states or areas listed separately in the tabulation, 31 show for increases over 1950 drilling. Of the nine showing for lessened drilling activity, the drop is only five wells in North Central Texas (RR Dist. 7-B) for 0.2 percent; North Louisiana, scheduled to be off from 1950 totals by 3.7 percent for 1263 wells, is closely crowded by Pennsylvania, to drill 1550 wells for a percentage of —4.1 against 1950's figure, and West Texas (District 8) with a drop of 4.2 percent and an estimated total of 3955 new wells. Northeast Texas (RR District 6) shows the greatest percentage drop of any area, registering off 9.8 percent from 1950 drilling to indicate 645 wells.

In order to avoid the listing of field wells seeking new pays and those attempting to extend a field—many of which are completed as producers in the zone proven by adjacent wells—this tabulation covers only strict wildcats, within the interpretation such term carries in the various areas under consideration. For the nation, the figure of 8363 not only establishes a new high for total wildcats, but also sets a new high in the percent of such wells against the total anticipated drilling for the year. The 1951 percentage will be 18.6, as compared to 18.0 for 1950.

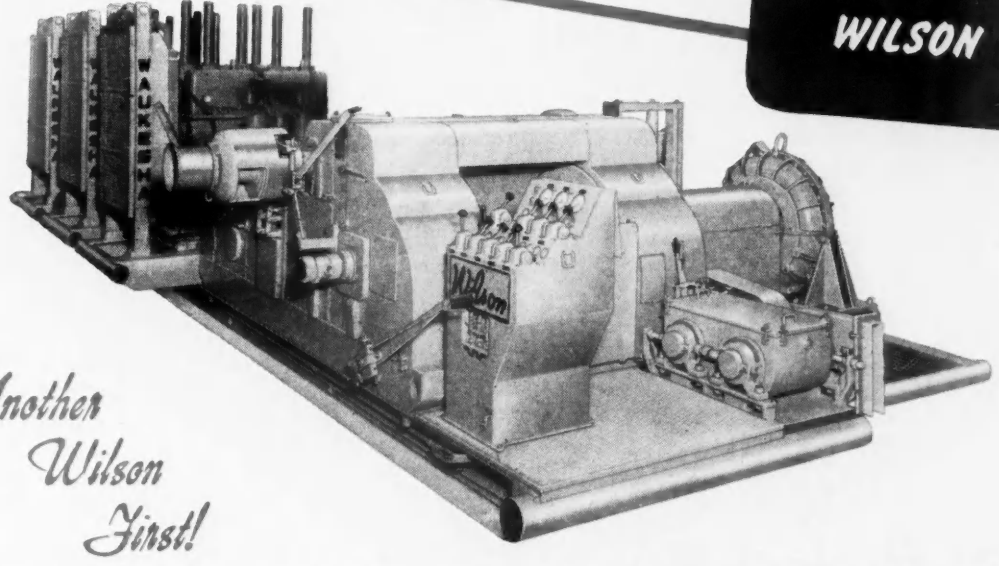
Texas, forecasting 3407 strict wildcats, will set aside 20 percent of all its drilling in the search for new fields. Of this total, 805 wells are scheduled for North Central Texas (District 7-B), which last year drilled 806. North Texas, again in second place, shows for 707 wells in 1951 against 692 in 1950. Oklahoma plans 655 strict wildcats against 594 last year, an increase of 10 percent against an overall change of only plus 3.4 percent. Indiana, forecasting 528 wildcats, should exceed its 1950 total of such wells by 9.5 percent, to keep pace with the 12.5 general increase forecast.

Indicated Number of Wells and Footage to Be Drilled in 1951

Forecast covers all new wells to be drilled for oil or gas in 1951, salt-water disposal wells, and water or gas-input wells for repressuring and secondary recovery, but does not estimate old wells drilled deeper.

STATE or DISTRICT	NEW WELLS			WILDCAT TESTS		FOOTAGE[1]			
	Forecast, 1951	Drilled, 1950	Percent Change	Forecast, 1951	Percent New Wells	To be Drilled, 1951	Drilled, 1950	Percent Change From 1950	Percent of U.S. Total 1951
Alabama	65	45	+ 44.4	22	33.8	340,000	198,313	+ 71.5	0.199
Arizona	8	7	+ 14.2	8	100.0	31,000	30,614	+ 1.3	0.020
Arkansas	485	397	+ 22.2	105	21.6	1,701,000	1,327,747	+ 28.1	0.997
California	2,136	1,791	+ 19.3	505	23.6	8,844,000	7,655,668	+ 15.5	5.185
Colorado	168	87	+ 93.1	81	48.2	725,000	390,713	+ 85.6	0.425
Florida	10	11	— 9.1	8	80.0	49,000	69,518	— 29.5	0.029
Illinois	2,650	2,910	— 8.9	750	28.3	5,914,000	6,358,355	— 7.0	3.467
Indiana	1,772	1,575	+ 12.5	528	29.8	3,100,000	2,724,640	+ 13.8	1.818
Kansas	4,083	3,998	+ 2.1	725	17.8	13,469,000	12,907,790	+ 4.3	7.897
Kentucky	1,300	1,247	+ 4.2	140	10.3	2,456,000	2,332,617	+ 5.3	1.440
Louisiana	2,635	2,444	+ 7.8	330	12.5	17,340,000	14,789,620	+ 17.2	10.167
North Louisiana	1,263	1,311	— 3.7	145	11.5	4,779,000	4,674,257	+ 2.2	2.802
South Louisiana	1,372	1,133	+ 21.1	185	13.5	12,561,000	10,115,363	+ 24.2	7.365
Maryland	30	4	+650.0	10	33.3	115,000	16,636	+591.3	0.067
Michigan	790	829	— 4.7	321	40.6	1,952,000	2,050,324	— 4.8	1.144
Mississippi	335	322	+ 4.0	145	43.3	2,581,000	2,330,060	+ 10.8	1.513
Missouri	28	27	+ 3.7	7	25.0	30,000	21,482	+ 39.7	0.020
Montana	288	268	+ 7.5	76	26.4	687,000	667,798	+ 2.9	0.403
Nebraska	144	107	+ 34.6	72	50.0	605,000	464,024	+ 30.4	0.355
New Mexico	666	593	+ 12.3	108	16.2	3,108,000	2,666,483	+ 16.5	1.822
New York	750	723	+ 3.7	15	2.0	1,104,000	1,056,985	+ 4.4	0.645
North Dakota and South Dakota	13	12	+ 8.3	13	100.0	77,000	49,602	+ 55.2	0.045
Ohio	1,040	970	+ 7.2	55	5.3	2,274,000	2,037,400	+ 11.6	1.333
Oklahoma	5,403	5,226	+ 3.4	625	11.6	19,898,000	18,973,152	+ 4.9	11.667
Oregon and Washington	9	2	+350.0	9	100.0	66,000	16,032	+311.7	0.039
Pennsylvania	1,550	1,616	— 4.1	50	3.2	2,818,000	2,938,386	— 4.1	1.652
Tennessee	25	3	+733.3	23	92.0	33,000	3,993	+240.4	0.020
Texas	17,042	16,755	+ 1.7	3,407	20.0	74,851,000	72,632,513	+ 3.1	43.886
Dist. 1—South Central	564	509	+ 10.8	235	41.7	1,673,000	1,551,002	+ 7.9	0.981
Dist. 2—Middle Gulf	728	689	+ 5.7	204	28.0	4,278,000	4,004,859	+ 6.8	2.508
Dist. 3—Upper Gulf	1,698	1,591	+ 6.7	300	17.7	10,568,000	9,552,040	+ 10.6	6.196
Dist. 4—Lower Gulf-S.W.	1,718	1,660	+ 3.5	315	18.3	8,539,000	8,103,934	+ 5.4	5.007
Dist. 5—East Central	190	206	— 7.8	73	38.4	781,000	919,165	— 15.0	0.458
Dist. 6—Northeast	645	715	— 9.8	86	13.3	3,168,000	3,436,503	— 7.8	1.857
Dist. 7-B—North Central	2,080	2,085	— 0.2	805	38.7	5,939,000	5,752,302	+ 3.2	3.482
Dist. 7-C—West Central	1,095	925	+ 18.4	275	25.1	4,648,000	3,887,076	+ 19.6	2.725
Dist. 8—West	3,955	4,129	— 4.2	387	9.8	22,400,000	23,007,476	— 2.6	13.134
Dist. 9—North	3,227	3,190	+ 1.2	707	21.9	9,172,000	9,096,332	+ 0.8	5.3678
Dist. 10—Panhandle	1,142	1,058	+ 7.9	20	1.8	3,685,000	3,321,824	+ 10.9	2.161
Utah	35	24	+ 45.8	24	68.6	121,000	83,875	+ 44.3	0.071
West Virginia	740	607	+ 21.9	45	6.1	2,474,000	1,604,643	+ 54.1	1.451
Wyoming	729	594	+ 22.7	104	19.2	3,651,000	2,940,578	+ 24.2	2.141
Others[2]	16	10	+ 60.0	16	100.0	142,000	94,038	+ 15.1	0.083
Total United States	44,945	43,204	+ 4.0	8,363	18.6	170,556,000	159,383,997	+ 7.0	100.000

[1] Footage drilled in 1950 and footage forecast for 1951 drilling include that for all new wells seeking production and for input or disposal purposes, but do not include footage of old wells drilled deeper in 1950, nor that footage expected to be added by drilling old wells deeper in 1951.
[2] Other states include: Georgia, Idaho, Nevada, North Carolina and Virginia.



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Wilson MANUFACTURING CO., Inc.
WICHITA FALLS, TEXAS

COMPLETIONS AND FOOTAGE

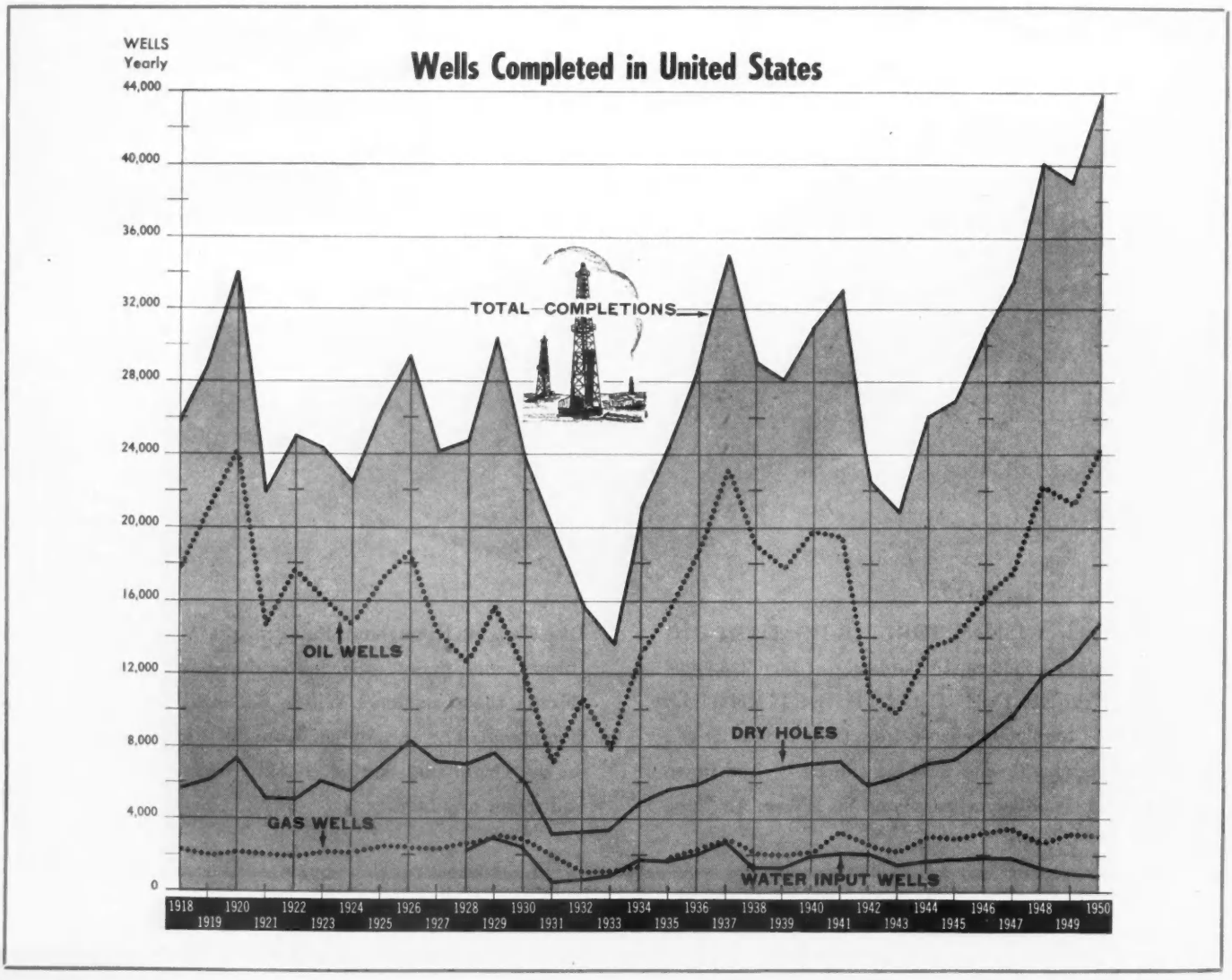
At Highest Levels

DESPITE fewer rigs in operation on the average throughout the U. S. compared to 1948, new well completions reached an all-time high of 43,204 in 1950. In addition a footage record was set at 159,393,997 which makes the average well for the year deeper than its predecessors.

Well completions last year were 11 percent above the 38,962 drilled in 1949 and 9 percent above the previous top year, 1948, with 39,477 completions. More rigs were in operation than in 1949 but fewer than in 1948. In view of the increased footage drilled in 1950 on a per-well basis, the efficiency of the American drilling contractor has been increasing year by year. For example, an average of 4950 rigs drilled 136,709,153 feet of hole in 1948—for an average total per rig of 27,600 feet; in 1949 an average of 4290 rigs drilled 138,616,941 feet for an average of 32,000 feet per rig; and last year 4517 rigs drilled 159,393,997 feet for an average of 35,300 feet per rig.

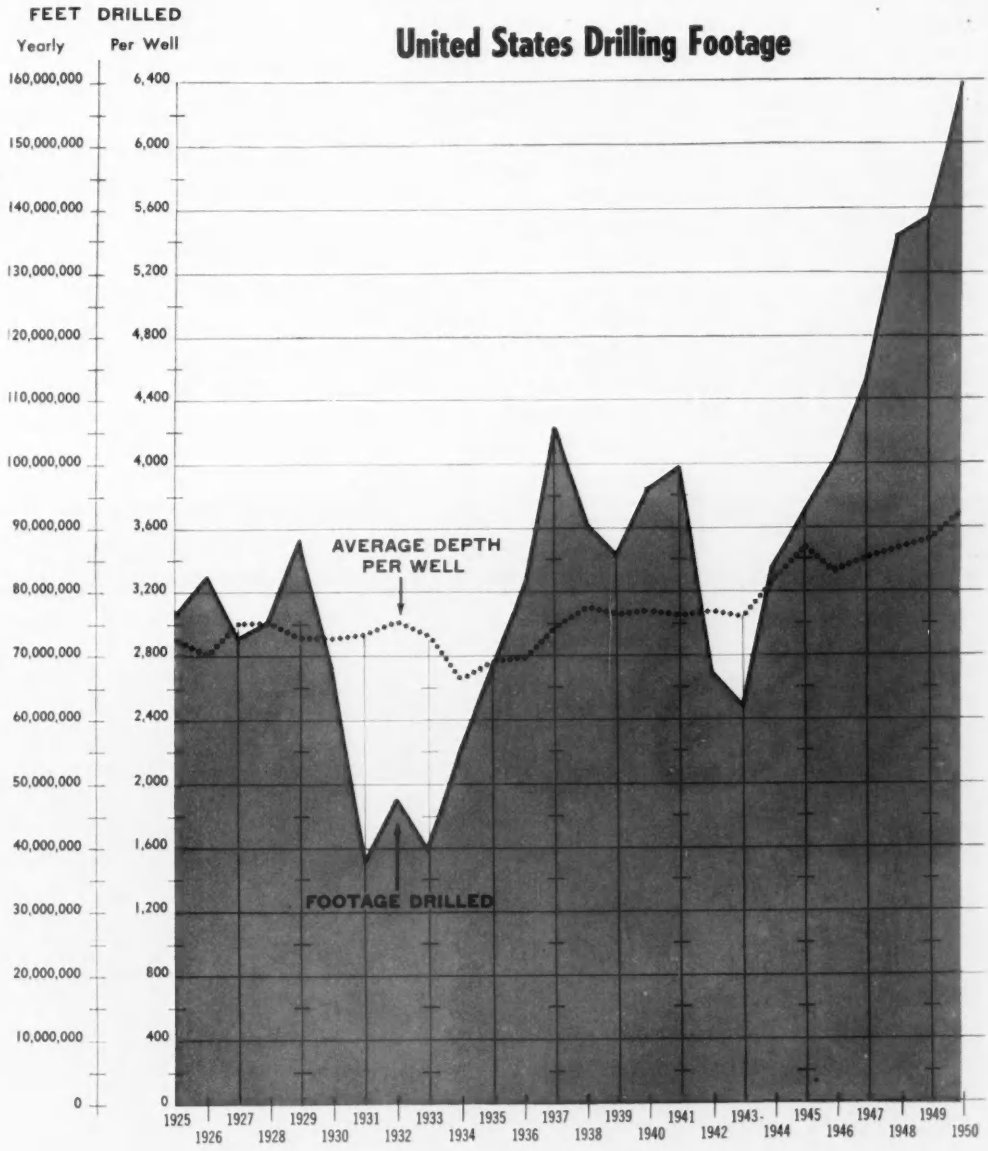
The increase of about 20.8 million feet of hole drilled in 1950 over the previous year is the fourth highest such increase in the history of the U. S. oil industry. The greatest year-to-year increase in total footage drilled occurred in 1937, which exceeded the previous year by 24 million feet; the second highest increase came in 1948, which was 23.9 million feet greater than the year before; and the third largest jump in footage was in 1944, which was 22 million feet greater than the preceding year.

Drillers were generally seeking deeper production during 1950 and they were drilling the wells faster. With this accelerated activity, however, the ratio of dry holes to completions was the highest in history—34 percent of new wells drilled. This percentage of dry holes has progressively increased year to year since 1918, when the dry holes were 22 percent



of the total. There are periods since then when the trend was disrupted and most of these periods correspond with the economic health of the U. S. For example, in the flush period of 1926 to 1929 a great deal of risk capital was in circulation and the percentage of dry holes increased from 23 to 30 percent of the total new completions. Operators were willing to take a chance then and more wildcatting was carried on. After 1929, risk capital was scarce and operators were more cautious. Dry holes dropped to 21 percent of the total completions and finally went to a low of 19 percent in 1937. Fewer completions were made in 1931, 1932 and 1933 than in any other year since 1918. During the last war dry hole percentages went up as high as 31 as the demand for oil spurred wildcatting to new peaks and this pace has continued up to the present.

The 43,204 new wells completed in 1950 included 42,050 tests for oil or gas, 928 water input wells, 123 gas injection wells, and 103 salt water disposal wells. In addition to these, 735 old wells were deepened to bring the total completions for the year to 43,939. This was in contrast to 1949, when 37,812 new wells were drilled for oil or gas, 1036 water input wells, 56 gas injection wells, 58 salt water disposal wells and 535 old wells were drilled deeper for an over-all total of 39,497 completions. With total completions up 11 percent, the number of



YEAR	New Wells Completed	Footage Drilled	Average Depth per Well	YEAR	New Wells Completed	Footage Drilled	Average Depth per Well	YEAR	New Wells Completed	Footage Drilled	Average Depth per Well
1925....	26,412	76,594,800	2900	1934....	21,122	56,141,433	2658	1943....	20,349	61,991,857	3046
1926....	29,456	82,476,800	2800	1935....	24,851	67,844,939	2760	1944....	25,786	84,378,457	3272
1927....	24,089	72,267,000	3000	1936....	28,962	80,996,816	2797	1945....	26,649	92,982,113	3489
1928....	24,765	74,295,000	3000	1937....	35,213	105,099,189	2985	1946....	30,230	101,124,813	3345
1929....	30,363	88,052,700	2900	1938....	29,127	90,585,158	3110	1947....	33,147	112,816,124	3404
1930....	23,711	68,761,900	2900	1939....	28,012	85,523,094	3053	1948....	39,477	136,709,153	3463
1931....	12,959	37,892,116	2924	1940....	31,149	96,182,605	3088	1949....	38,962	138,616,941	3558
1932....	15,836	47,682,196	3011	1941....	32,510	99,347,714	3056	1950....	43,204	159,383,997	3689
1933....	13,523	39,568,298	2926	1942....	21,990	67,903,053	3088				

Data for Old Wells Drilled Deeper not included in above statistics. **Source:** Records of THE OIL WEEKLY and WORLD OIL.

wells seeking oil or gas production was up an equal amount; water input wells decreased over 11 percent; gas injection wells increased 120 percent due to increased secondary recovery programs; salt water disposal wells increased 78 percent; and old wells deepened increased 37 percent.

As mentioned, the average depth per well in 1950 was the highest ever. Generally, shallow production is seldom found any longer in the U. S., but new medium to deep pay sections are coming to the fore. Drillers are going deeper for oil, and the average depth per well will probably increase steadily for the next few years. This is not to say that shallow production can be discounted for the future, but the quantities of oil found at depth hold more attractions for the oil companies. A good example of this are the lush limestone reefs being found and exploited in the past two years at the 6000-foot level. Average depth per well in 1950 was 3689 feet—an increase of 131 feet over 1949, which was 95 feet greater than 1948.

Last year again saw drilling activity widely distributed with 33 of the 48 states participating in the drilling campaign. This was one state less than 1949 as Nevada drilled two wells last year and none the previous year; Idaho drilled five wells last year and none in 1949; North Carolina drilled one in 1949 and none in 1950; Oregon drilled one in 1949 and none last year; and Virginia drilled 16 in 1949 and none in 1950.

As could be expected, the largest producing states had the greatest amount of drilling activity last year, accounting for 77 percent of the wells completed as compared with 74 percent the year before. In order of the greatest drilling activity these states were Texas, Oklahoma, Kansas, Illinois, Louisiana and California. California was ahead of Louisiana in 1949.

Texas recorded the greatest increase in drilling, its completions having been up 2967 wells or 21 percent. A total of 17,079 wells were completed in the state last year as West, North and West Central Texas accounted for the greatest portion of the increase. Texas had more than three times as many wells as its nearest contender, Oklahoma, and accounted for 39 percent of the nation's total. Footage drilled in Texas was 25 percent greater than 1949 and was 46 percent of the nation's total footage. West Texas not only had more wells in 1950 but increased the average depth per well from 4950 to 5400 feet. North Texas was drilling only 100 feet deeper last year to make its per-well average 2840 feet. West Central Texas had shallower new wells in 1950 with an average depth of 3960 feet as compared with 4400 feet in 1949.

Oklahoma completed 5363 wells to retain second place in the nation. The total footage drilled there was also second highest by a wide margin. The number of wells was 21 percent greater than 1949, and the 19,071,211 total footage was 22 percent higher. The average depth per well in Oklahoma remained practically constant at 3550 feet in 1949 and 1950.

The combined footage of Texas and Oklahoma was 57.5 percent of the nation's total, accounting for nearly 100 million feet of the 160 million feet drilled.

The Eastern States and California showed the greatest decrease in drilling activity. California slumped more than 550 wells, New York dropped nearly 200, Pennsylvania more than 400, and Michigan, Ohio and West Virginia took noticeable drops.

(See Table on Page 98)

Wells Completed Annually in United States

(Source: WORLD OIL and predecessor, The Oil Weekly, with aid of other authoritative sources, 1921 to now; 1920 and earlier years from U. S. Bureau of Mines and Petroleum in the United States and Possessions, by Arnold and Kemnitzer)

YEAR	NEW WELLS							Total New Wells	Old Wells Drilled Deeper	Total Completions
	Oil	Distillate	Gas	Dry	Water Input	Gas Injection	Salt Water Disposal			
1859-1917	380,502	....	20,183	91,821	.....	....	....	492,506	....	492,506
1918	17,860	....	2,324	5,629	.....	....	....	25,813	....	25,813
1919	21,041	....	2,153	6,075	.....	....	....	29,269	....	29,269
1920	24,278	....	2,275	7,476	.....	....	....	34,029	....	34,029
1921	14,715	....	2,081	5,193	.....	....	....	21,989	....	21,989
1922	17,790	....	1,926	5,191	.....	....	....	24,907	....	24,907
1923	16,182	....	2,140	6,043	.....	....	....	24,365	....	24,365
1924	14,707	....	2,172	5,591	.....	....	....	22,470	....	22,470
1925	17,029	....	2,536	6,847	.....	....	....	26,412	....	26,412
1926	18,626	....	2,502	8,328	.....	....	....	29,456	....	29,456
1927	14,382	....	2,494	7,213	.....	....	....	24,089	....	24,089
1928	12,505	....	2,754	7,164	2,342	....	....	24,765	....	24,765
1929	15,758	....	3,107	7,600	3,898	....	....	30,363	....	30,363
1930	12,133	....	2,971	6,163	2,444	....	....	23,711	....	23,711
1931	7,061	....	2,067	3,264	567	....	....	12,959	....	12,959
1932	10,569	....	1,079	3,389	799	....	....	15,836	....	15,836
1933	7,887	....	1,190	3,492	954	....	....	13,523	....	13,523
1934	13,119	....	1,496	4,811	1,696	....	....	21,122	....	21,122
1935	15,418	....	1,802	5,696	1,665	....	....	24,581	....	24,581
1936	18,704	....	2,375	5,787	2,096	....	....	28,962	....	28,962
1937	23,115	....	2,732	6,627	2,739	....	....	35,213	....	35,213
1938	19,106	....	2,143	6,515	1,363	....	....	29,127	....	29,127
1939	17,734	....	2,030	6,890	1,358	....	....	28,012	....	28,012
1940	19,843	....	2,265	7,053	1,988	....	....	31,149	....	31,499
1941	19,590	....	3,279	7,280	2,197	117	47	32,510	822	33,332
1942	10,977	105	2,685	5,962	2,141	73	47	21,990	588	22,578
1943	9,887	76	2,314	6,364	1,576	90	42	20,349	471	20,820
1944	13,502	54	3,024	7,153	1,784	218	51	25,786	377	26,163
1945	13,944	153	3,039	7,346	1,796	329	42	26,649	491	27,140
1946	16,087	207	3,355	8,496	1,816	219	50	30,230	615	30,845
1947	17,613	283	3,437	9,751	1,861	156	46	33,147	651	33,798
1948	22,197	346	2,966	11,939	1,885	84	60	39,477	533	40,010
1949	21,415	378	3,121	12,898	1,036	56	58	38,962	535	39,497
*1950	23,812	466	2,973	14,799	928	123	103	43,204	735	43,939
TOTAL	919,088	2,068	100,990	321,846	40,929	1,465	546	1,386,932	5,818	1,392,750

* Data for 1950 subject to slight revision.

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Footage and Average Depths Drilled in All Wells in the United States in 1950

STATE or DISTRICT	OIL			DISTILLATE			GAS			DRY			WATER INPUT			GAS INPUT		
	Wells	Footage	Avge. Depth	Wells	Footage	Avge. Depth	Wells	Footage	Avge. Depth	Wells	Footage	Avge. Depth	Wells	Footage	Avge. Depth	Wells	Footage	Avge. Depth
Alabama	18	68,931	3830				1	2,302	2302	26	127,080	4888						
Arizona										7	30,614	4373						
Arkansas	246	733,290	2981	2	16,718	8359	4	15,185	3796	145	562,554	3796						
California	1,284	5,838,402	4547	3	18,128	6043	47	202,177	4302	455	1,581,745	3476				2	15,216	7608
Colorado	20	105,654	5283				11	52,740	4795	56	232,319	4149						
Florida	1	11,576	11576							10	57,942	5794						
Georgia										3	13,270	4423						
Idaho										5	16,367	3273						
Illinois	1,300	2,838,203	2183				20	23,892	1195	1,589	3,495,225	2200	1	1,035	1035			
Indiana	575	984,307	1712				51	62,671	1229	920	1,648,768	1792	18	14,330	796	1	840	840
Kansas	1,962	6,271,708	3197				402	1,118,603	2783	1,581	5,329,117	3371	2	4,231	2116			
Kentucky	506	885,083	1749	1	1,468	1468	255	547,324	2146	484	897,788	1859				1	954	954
Louisiana	1,307	7,197,094	5507	174	1,758,830	10108	199	825,298	4147	757	4,981,327	6580	1	9,708	9708			
North Louisiana	689	1,953,066	2835	63	557,247	8845	156	440,571	2824	398	1,708,871	4294						
South Louisiana	618	5,244,028	8485	111	1,201,583	10825	43	384,727	8947	359	3,272,456	9115	1	9,708	9708			
Maryland							1	2,869	2869	3	13,767	4589						
Michigan	340	897,388	2639				32	82,448	2577	456	1,066,228	2338						
Mississippi	94	621,232	6609	46	343,117	7459	1	9,011	9011	181	1,356,700	7496						
Missouri	2	653	327				11	5,824	529	14	15,005	1072						
Montana	149	354,856	2382				21	48,262	2298	98	264,680	2701						
Nebraska	30	140,804	4693				12	60,385	5032	65	262,835	4044						
Nevada										2	14,439	7220						
New Mexico	400	1,799,403	4499	2	21,178	10589	59	223,890	3795	132	622,372	4715						
New York	436	624,662	1433							1	5,289	5289	286	427,034	1493			
North Dakota										3	27,062	9021						
Ohio	348	651,778	1873				270	621,874	2303	352	763,748	2170						
Oklahoma	3,114	2,288,880	3946	28	205,522	7340	238	713,069	2996	1,766	5,592,232	3167	50	111,631	2233	14	22,389	1599
Pennsylvania	572	923,609	1615				324	776,770	2397	97	252,162	2600	527	831,957	1579	96	153,888	1603
South Dakota										7	22,540	3220						
Tennessee							1	838	838	2	3,155	1578						
Texas	10,612	47,405,566	4467	208	1,677,591	8065	645	3,085,504	4784	5,221	20,289,909	3886	43	90,648	2108	9	35,212	3912
Dist. 1 South Central	225	732,371	3255	7	46,465	6638	7	25,250	3607	266	739,461	2780	1	2,105	2105			
Dist. 2 Middle Gulf	349	1,963,392	5626	37	277,051	7488	61	354,844	5817	242	1,409,572	5825						
Dist. 3 Upper Gulf	922	5,248,828	5693	56	520,766	9299	85	642,864	7563	523	3,109,837	5946				3	19,903	6634
Dist. 4 Lower Gulf-S.W.	930	4,451,626	4787	59	433,878	7354	94	566,285	6024	576	2,648,086	4597	1	4,077	4077			
Dist. 5 East Central	82	436,492	5323	6	50,807	8468	10	60,536	6054	102	364,193	3571	6	7,137	1190			
Dist. 6 Northeast	530	2,338,328	4412	23	173,540	7545	36	253,810	7050	125	667,580	5341	1	3,245	3245			
Dist. 7-B North Central	993	2,715,029	2734	3	13,990	4663	37	120,263	3250	1,043	2,876,884	2758	2	4,014	2007	1	1,721	1721
Dist. 7-C West Central	559	2,292,688	4101	13	127,096	9777	13	83,551	6427	340	1,383,741	4070						
Dist. 8 West	3,602	20,151,726	5595	3	28,640	9547	5	19,756	3951	514	2,786,339	5421	5	21,015	4203			
Dist. 9 North	1,733	4,971,249	2869	1	5,358	5358	25	131,868	5275	1,391	3,912,724	2813	27	49,055	1817	5	1,358	2718
Dist. 10 Panhandle	687	2,103,837	3062				272	826,477	3039	99	391,510	3955						
Utah	4	22,212	5553				1	2,027	2027	19	59,636	3139						
Washington										2	16,032	8016						
West Virginia	132	241,538	1830				352	1,046,298	2972	123	316,807	2576						
Wyoming	360	1,788,230	4967	2	17,869	8935	15	95,487	6366	217	1,038,992	4788						
Total United States	23,812	92,695,059	3893	466	4,060,421	8713	2,973	9,624,748	3237	14,799	50,977,706	3445	928	1,490,574	1606	123	228,499	1858

STATE or DISTRICT	SALT WATER DISPOSAL			TOTAL NEW WELLS—(Preceding Classes) 1950			TOTAL NEW WELLS—(Preceding Classes) 1949			OLD WELLS DRILLED DRILLED, 1950 (Productive and Dry)			TOTAL ALL WELLS 1950			TOTAL ALL WELLS 1949		
	Wells	Footage	Avge. Depth	Wells	Footage	Avge. Depth	Wells	Footage	Avge. Depth	Wells	Footage	Avge. Depth	Wells	Footage	Avge. Depth	Wells	Footage	Avge. Depth
Alabama				45	198,313	4407	18	86,528	4807	1	475	475	46	198,788	4321	19	88,654	4666
Arizona				7	30,614	4373	5	15,603	3121	1	1,494	1494	8	32,108	4014	5	15,603	3121
Arkansas				397	1,327,747	3344	333	1,303,803	3915	2	1,489	744	399	1,329,236	3331	336	1,303,935	3881
California				1,791	7,655,668	4275	2,412	9,864,371	4090	131	93,099	711	1,922	7,748,767	4032	2,485	9,919,185	3992
Colorado				87	390,713	4491	68	298,978	4397	5	3,021	604	92	393,734	4280	70	305,355	4362
Florida				11	69,518	6320	18	125,743	6986				11	69,518	6320	18	125,743	6986
Georgia				3	13,270	4423	4	12,437	3109				3	13,270	4423	4	12,437	3109
Idaho				5	16,367	3273							5	16,367	3273			
Illinois				2,910	6,358,355	2185	2,719	6,353,121	2337	1	40	40	2,911	6,358,395	2184	2,721	6,355,023	2336
Indiana	10	13,724	1372	1,575	2,724,640	1730	1,246	2,306,650	1851	6	1,807	301	1,581	2,726,447	1725	1,254	2,310,403	1842
Kansas	51	184,131	3610	3,998	12,907,790	3229	3,081	10,164,043	3299	5	4,631	926	4,003	12,912,421	3226	3,082	10,164,640	3298
Kentucky				1,247	2,332,617	1871	1,107	1,921,177	1735	2	254	127	1,249	2,332,871	1868	1,107	1,921,177	1735
Louisiana	6	17,363	2894	2,444	14,789,620	6051	2,335	12,492,074	5350	20	26,166	1308	2,464	14,815,786	6013	2,342	12,504,218	5339
North Louisiana	5	14,502	2900	1,311	4,674,257	3565	1,428	4,643,808	3252	7	6,559	937	1,318	4,680,816	3551	1,434	4,654,779	3246
South Louisiana	1	2,861	2861	1,133	10,115,363	8928	907	7,848,266	8653	13	19,607	1,508	1,146	10,134,970	8844	908	7,849,439	8645
Maryland				4	16,636	4159	1	4,910	4910				4	16,636	4159	1	4,910	4910
Michigan	1	4,260	4260	829	2,050,324	2473	901	2,066,238	2293	5	4,916	983	834	2,055,240	2464	902	2,068,339	2293
Mississippi				322	2,330,060	7236	337	2,454,063	7282	3	4,391	1467	325	2,334,451	7183	337	2,454,063	7282
Missouri				27	21,482	796	32	17,078	534				27	21,482	796	32	17,078	534
Montana				268	667,798	2492	250	624,542	2498	1	135	135	269	667,933	2483	251	626,520	2496
Nebraska				107	464,024	4337	15	64,272	4285	1	117	117	108	464,141	4298	15	64,272	4285
Nevada				2	14,439	7220							2	14,439	7220			
New Mexico				593	2,666,843	4497	499	2,246,722	4502	20	31,059	1553	613	2,697,902	4401	517	2,254,904	4362
New York				723	1,056,985	1462	915	1,306,960	1428				723	1,056,985	1462	915	1,306,960	1428
North Carolina							1	1,280	1280							1	1,280	1280
North Dakota				3	27,062	9021	5	26,465	5293				3	27,062	9021	5	26,465	5293
Ohio				970	2,037,400	2100	1,028	2,196,101	2136	22	15,548	707	992	2,052,948	2070	1,048	2,207,198	2106
Oklahoma	16	39,429	2464	5,226	18,973,152	3631	4,316	15,567,514	3607	137	98,059	716	5,363	19,071,211	3556	4,411	15,624,655	3542
Oregon							1	6,480	6480							1	6,480	6480
Pennsylvania				1,616	2,938,386	1818	2,008	3,834,561	1910	18	18,789	1044	1,634	2,957,175	1810	2,075	3,904,040	1881
South Dakota				7	22,540	3220	6	12,803	2134				7	22,540	3220	6	12,803	2134
Tennessee				3	3,993	1331	47	48,591	1034				3	3,993	1331	47	48,591	1034
Texas	19	48,083	2531	16,757	72,632,513	4334	13,895	58,137,798	4184	322	251,090	780	17,079	72,883,603	4267	14,112	58,316,093	4132
Dist. 1 South Central	3	5,350	1783	509	1,551,002	3047	554	1,674,736	3023	18	5,082	282	527	1,556,084	2953	565	1,678,282	2965
Dist. 2 Middle Gulf				689	4,004,859	5813	643	3,825,584	5950	9	9,588	1065	698	4,014,447	5751	657	3,839,911	5845
Dist. 3 Upper Gulf	2	9,842	4921	1,591	9,552,040	6004	1,387	8,292,023	5978	13	31,274	2406	1,604	9,583,314	5975	1,397	8,310,362	5949
Dist. 4 Lower Gulf-S.W.				1,660	8,103,934	4882	1,313	6,640,149	5057	26	31,821	1224	1,686	8,135,755	4825	1,345	6,670,508	4959
Dist. 5 East Central				206	919,165	4462	195	923,873	4738	1	98	98	207	919,263	4441	196	923,918	4714
Dist. 6 Northeast				715	3,436,503	4806	883	3,955,490	4480	3	14,047	4682	718	3,450,550	4806	890	3,959,667	4449
Dist. 7-B North Central	6	20,401	3400	2,085	5,752,302	2759	1,887	5,574,269	2954	29	28,626	987	2,114	5,780,928	2735	1,902	5,587,088	2938
Dist. 7-C West Central				925	3,887,076	4202	491	2,235,847	4554	57	9,281	163	982	3,896,357	3968	511	2,248,904	4400
Dist. 8 West				4,129	23,007,476	5572	2,793	14,182,135	5078	147	111,218	757	4,276	23,118,694	5407	2,883	14,252,050	4943
Dist. 9 North	8	12,490	1561	3,190	9,096,332	2852	2,652	7,300,133	2753	19	10,055	529	3,209	9,106,387	2838	2,668	7,312,654	2741
Dist. 10 Panhandle				1,058	3,321,824	3140	1,097	3,533,559	3221				1,058	3,321,824	3140	1,097	3,533,559	3221
Utah				24	83,875	3495	56	279,699	4995				24	83,875	3495	57	283,899	4981
Virginia							16	71,098	4444							16	71,098	4444
Washington				2	16,032	8016	2	4,910	2455				2	16,032	8016	2	4,910	2455
West Virginia				607	1,604,643	2644	687	1,871,388	2724	26	29,241	1125	633	1,633,884	2581	700	1,885,145	2693
Wyoming				594	2,940,578	4950	598	2,828,940	4731	6	7,762	1294	600	2,948,340	4914	603	2,846,544	4721
Total United States	103	306,990	2980	43,204	159,383,997	3689	38,962	138,616,941	3558	735	593,583	808	43,939	159,977,580	3641	39,497	139,062,620	3521

OIL WELLS CAN BE ORNERY TOO

Being ornery and unpredictable is a valuable trait in a rodeo bronc, but a mighty expensive condition in an oil well. And oil wells do seem to act pretty ornery sometimes when you try to perforate the casing with out-dated methods that give uncertain penetration and leave an unknown condition at the pay zone. However, for the many progressive operators who have standardized on the modern Welex Jet process for *every* perforating job, such problems are practically a thing of the past. More than half the casing perforating done in the U. S. today is done by the Jet method originated by Welex. The record of results in the thousands of wells Jet perforated proves that Welex gives you *300% deeper penetration* than any other practical method, and provides a *known hole density per foot,* with *no fracturing of the cement sheath.* Results cost less with Welex Jets. Call your nearest Welex Station for prompt service day or night.

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RIGS IN OPERATION

Increase 5 Percent During 1950

THE number of drilling rigs in operation in the U. S. at 1950's end surpassed 1949 substantially and this was apparent in the new footage record set. However, fewer wells were drilled near the first of the year which cut down the year's averge.

The average number of rigs, cable and rotary combined, operated in 1950 was 4517 compared to 4290 in 1949, 4950 in 1948, and 4738 in 1947. A 5 percent increase in rigs running last year is reflected in the 15 percent increase in footage drilled. Increased drilling efficiency was especially notable last year when 159.4 million feet of hole were drilled with an average of 4517 rigs while the top year for rigs running, 1948, saw only 136.7 million feet drilled with an average of 4950 rigs. Another factor contributing to this unbalance between the two years was the fact that the 1950 wells were deeper and more wells were drilled with fewer rigs.

Rig activity showed the usual pattern of a slow start in the early months with stepped up operations in the summer and fall months. This pattern had been practically reversed in 1949 when demand for oil took a slump in the summer and fall months. August was the high month last year and March the low, which is considered about normal; however, the Korean War in June influenced some of the increased demand last fall. Drilling operations usually parallel the producers' outlook.

The end of January last year saw only 4180 rigs operating as compared with 4355 the month before. This was attributed to the fact that the early winter had tapered off and stocks of fuel oil were piling up un-

U. S. Drilling Rigs in Use During 1950, by States, by Months

Figures are for end of month, and include rigs drilling, rigging up, and temporarily shut down.

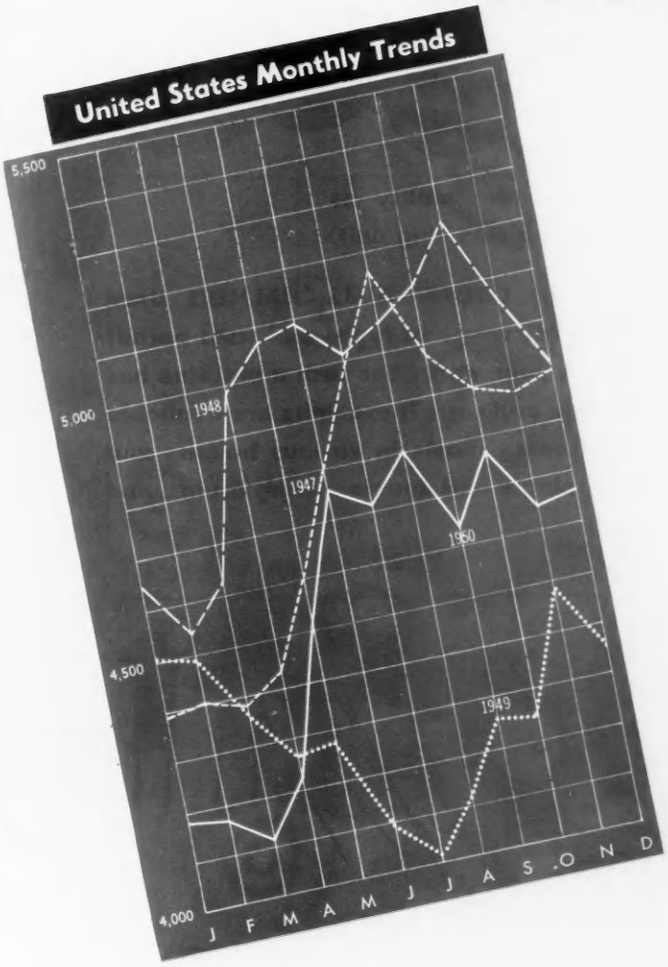
	1949		1950											
STATE or DISTRICT	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Alabama	4	2	3	1	1	4	3	11	4	8	7	5	8	8
Arizona	4	3	4	4	5	4	4	5	5	4	5	4	3	3
Arkansas	26	25	22	19	22	20	24	34	26	29	26	36	37	30
California	227	206	257	259	194	225	223	259	210	209	208	232	192	207
Colorado	17	14	4	11	14	11	12	17	17	15	21	18	25	25
Florida	4	4	4	4	1	3	1	.....	2	2	1	1	1	1
Georgia	1	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Idaho	.....	.....	2	2	2	2	3	3	3	3	2	1	1	1
Illinois	255	234	181	164	171	207	249	266	274	263	255	255	250	246
Indiana	143	138	123	139	150	180	191	190	210	204	198	190	194	217
Kansas	303	302	299	298	269	292	351	350	362	348	322	330	333	337
Kentucky	93	86	84	89	85	98	108	113	116	112	106	108	110	101
Louisiana	241	236	236	238	238	221	217	243	234	242	227	229	252	235
North Louisiana	82	75	69	69	67	57	71	74	75	70	67	76	88	78
South Louisiana	159	161	167	169	171	164	146	169	159	172	160	153	164	157
Maryland	.....	.....	.....	1	1	1	2	2	2	2	2	.....	5	8
Michigan	140	135	133	120	132	138	140	154	145	147	142	138	116	120
Mississippi	38	34	25	30	32	29	24	23	26	25	28	28	27	27
Missouri	10	7	7	9	9	5	7	6	6	7	8	6	6	6
Montana	43	35	17	22	16	17	29	32	42	39	41	41	37	34
Nebraska	6	7	8	5	4	2	2	9	12	12	11	13	10	9
Nevada	.....	.....	.....	.....	.....	.....	1	1	1	2	2	1	.....	1
New Mexico	103	95	90	80	71	68	75	103	98	95	87	87	87	108
New York	95	105	101	93	78	76	83	94	99	114	112	100	92	75
North Dakota	1	.....	.....	.....	.....	.....	.....	1	2	4	1	2	2	2
Ohio	169	152	174	135	137	138	131	149	148	157	156	161	156	140
Oklahoma	545	540	534	550	553	540	527	593	619	644	671	692	671	682
Oregon	.....	.....	.....	.....	.....	.....	1	1	1	1	1	1	1	1
Pennsylvania	248	245	230	204	191	203	251	260	263	263	253	255	250	243
South Dakota	2	2	.....	.....	.....	.....	2	1	1	1	1	1	.....	.....
Tennessee	7	7	11	8	8	8	9	9	9	8	8	8	7	8
Texas	1,384	1,398	1,314	1,376	1,407	1,401	1,502	1,492	1,425	1,487	1,369	1,481	1,469	1,485
Dist. 1 South Central	39	33	34	31	30	29	30	32	28	39	30	38	34	35
Dist. 2 Middle Gulf	51	43	40	54	56	59	61	62	57	54	55	61	50	57
Dist. 3 Upper Gulf	136	125	113	109	117	140	137	144	129	130	126	150	144	149
Dist. 4 Lower Gulf-S.W.	100	111	100	117	113	122	130	117	101	131	121	118	104	110
Dist. 5 East Central	24	21	17	20	27	27	23	25	21	16	18	19	22	29
Dist. 6 Northeast	43	42	34	39	33	33	33	32	39	32	33	44	37	50
Dist. 7-B North Central	175	167	159	154	150	142	132	133	126	116	104	135	147	144
Dist. 7-C West Central	86	90	88	90	86	78	85	93	89	96	86	82	105	109
Dist. 8 West	459	479	453	477	499	470	532	526	514	563	509	547	484	459
Dist. 9 North	173	181	174	185	192	200	224	224	220	211	196	196	239	236
Dist. 10 Panhandle	98	106	102	100	104	101	115	104	101	99	91	91	103	107
Utah	12	8	5	5	8	8	7	8	9	8	8	12	10	11
Virginia	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Washington	1	.....	1	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
West Virginia	256	242	250	247	261	275	284	255	260	265	260	245	210	205
Wyoming	106	91	60	53	52	47	53	75	80	83	93	91	86	85
Total United States	4,485	4,355	4,180	4,169	4,114	4,224	4,518	4,760	4,712	4,804	4,633	4,773	4,649	4,665

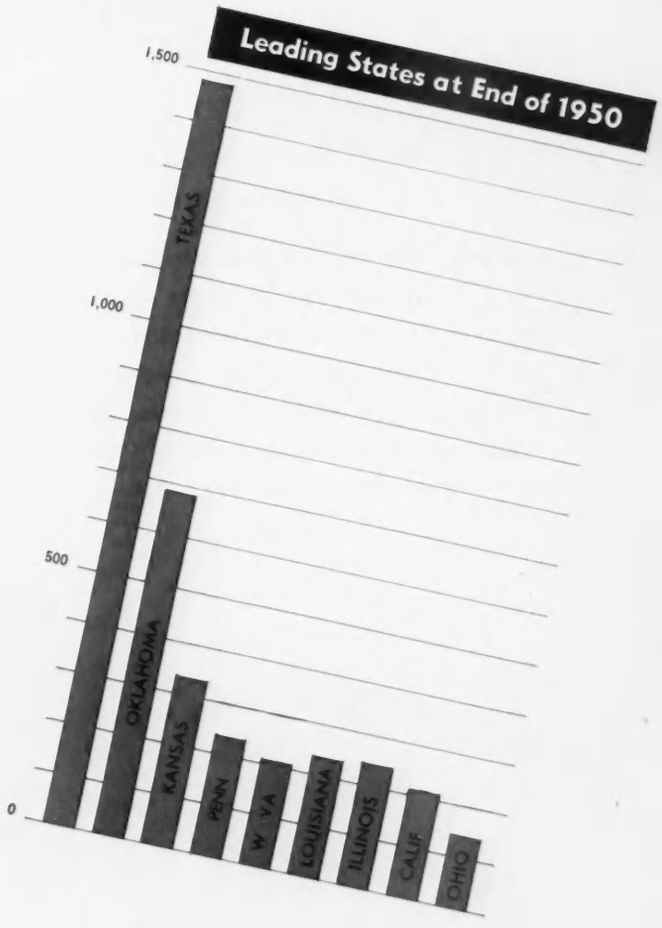
expectedly. In addition, coal was more plentiful than the winter of 1948-1949. With decreased demand, rigs were being stacked until a low of 4114 rigs were operating at the end of March, 1950. From there the rigs started picking up until a peak was reached at the end of August, when 4804 rigs were in use.

There were 43,204 wells completed and 159,393,997 feet of hole drilled in 1950, not including old wells drilled deeper but including input and disposal wells. With an average of 4517 rigs in use during the year, each rig drilled 9½ wells and 35,300 feet of hole during 1950. This is somewhat better than the previous year's average of nine wells and 32,000 feet of hole. A war year, 1943, saw 20,349 new wells completed for a total of 61,991,857 feet of hole with an average of 3041 wells utilized. That year each rig averaged 6½ wells and 20,350 feet of hole.

The large producing oil states had more rigs running at the end of last year than were operating at the end of 1949. Illinois, Indiana, Kansas, New Mexico, Oklahoma and Texas all had increased activity while Louisiana, Pennsylvania and Wyoming showed a slight drop. Louisiana had more rigs running last year month by month than in 1949 but experienced a slowdown in December. Texas came up sharply in rigs operating, reaching 1485 at the end of 1950 as compared to 1398 at the end of 1949.

Drilling Rigs Operating in United States





Drilling Rigs in Use in U. S., by Years, by Months

Figures are for end of month, and include rigs drilling, rigging up, and shut down

YEAR	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1938	3,968	3,928	3,973	3,971	3,582	3,830	3,737	3,869	3,742	3,876	3,676	3,434
1939	3,583	3,391	3,448	3,630	3,695	3,726	3,567	3,718	3,625	3,905	3,981	3,924
1940	3,990	4,277	4,472	4,327	4,655	4,502	4,235	4,194	3,821	3,921	4,030	3,894
1941	3,814	3,952	4,121	4,287	4,335	4,598	4,819	4,984	4,693	4,672	4,746	4,336
1942	3,816	3,067	2,979	2,859	2,868	2,905	3,179	3,007	2,953	3,094	2,962	2,797
1943	2,691	2,653	2,732	2,756	2,743	2,852	3,015	3,201	3,031	3,548	3,676	3,595
1944	3,427	3,568	3,702	3,819	3,934	4,278	4,411	4,528	4,566	4,738	4,665	4,640
1945	4,270	4,154	4,159	4,374	4,637	4,394	4,424	4,289	4,356	4,521	4,426	4,637
1946	4,337	4,229	4,212	4,405	4,399	4,124	4,235	4,201	4,474	4,410	4,551	4,654
1947	4,390	4,402	4,379	4,470	4,603	4,802	4,992	5,163	4,979	4,897	4,871	4,945
1948	4,699	4,542	4,626	4,989	5,067	5,090	5,013	5,058	5,116	5,229	5,060	4,908
1949	4,511	4,490	4,368	4,265	4,276	4,097	4,015	4,118	4,258	4,247	4,485	4,355
1950	4,180	4,169	4,114	4,224	4,518	4,760	4,712	4,804	4,633	4,773	4,649	4,665

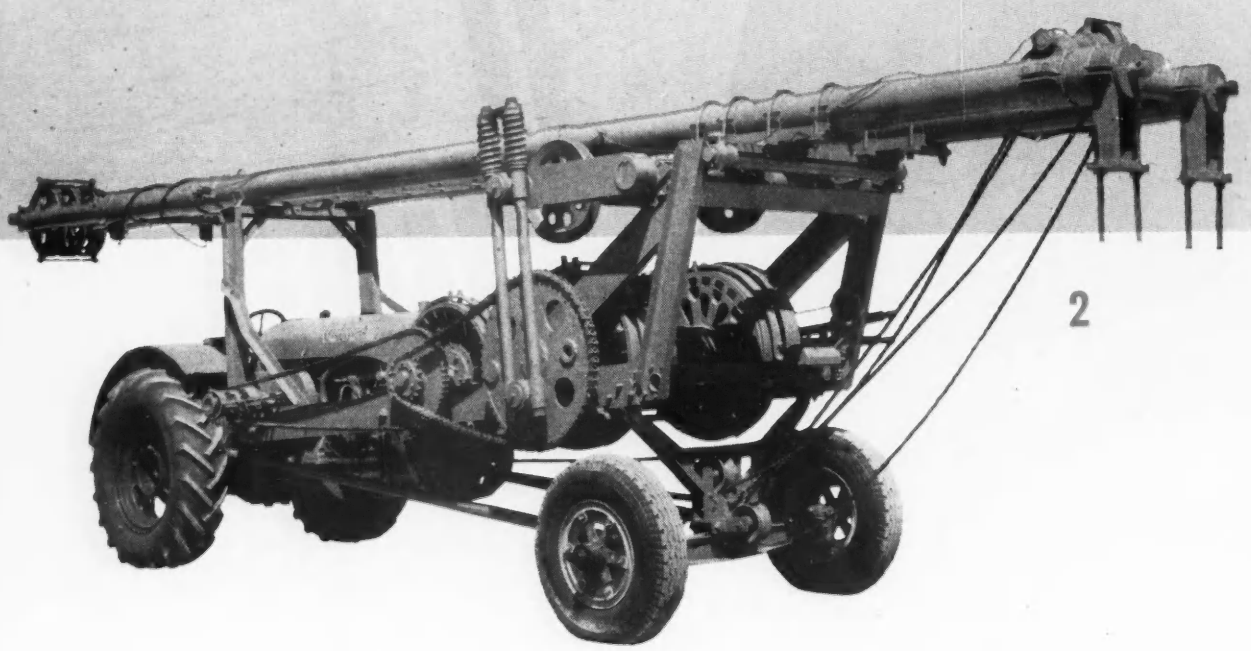
Not one but FOUR

to help Reduce Your

1

The right size, capacity, speed and adaptability as well as price determines the worth of a servicing unit.

The only line of self-propelled units has been built by COOPER–ALLIS-CHALMERS since 1918. The FOUR typical units are shown here. The wide range of types and sizes permit the use of a machine practically "custom tailored" to your work. Yet such a machine has all the advantages of mass production, standardization and cost. These units are available with wide mud dual tires, single and two-pole telescoping masts in various heights and weights, Cooper Quick-Drop Spudders, rotary drive, single and double pulling drums, and air controls on the models L & E.



2

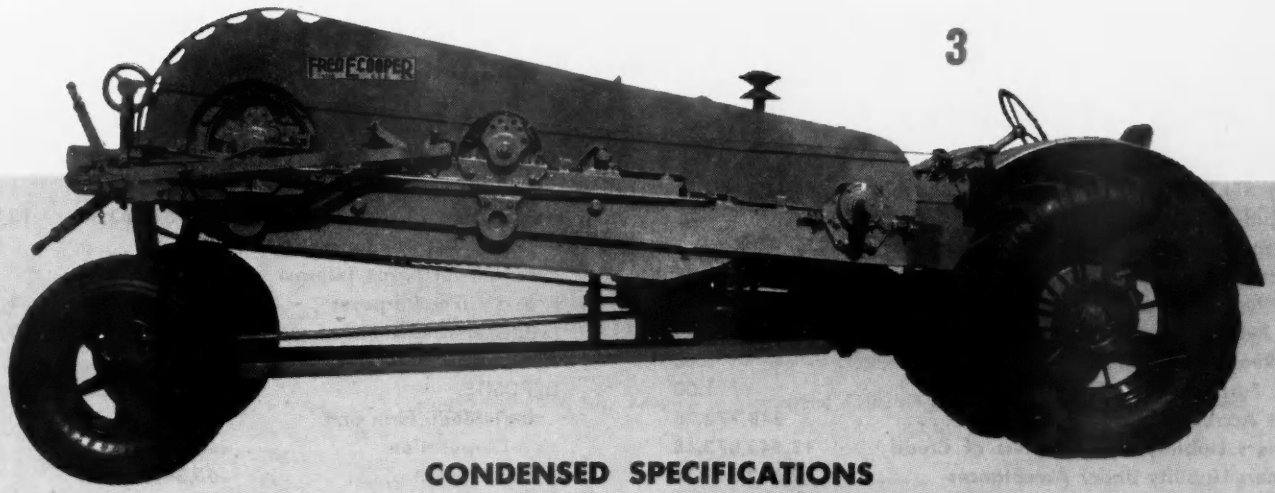
1. Model L-844-52 Single Drum Winch Tractor with single pole telescoping mast. For deep well servicing.

2. Model E-563 Double Drum Winch Tractor equipped with Cooper Quick-Drop Spudder and 2 pole telescoping mast. For servicing to 6,000′.

3. Model M-318 Double Drum Winch Tractor. Can be furnished as Single Drum unit and equipped with large front tires and dual rears. For servicing to 4,000′.

4. Model W-201 Double Drum Winch Tractor. Can be furnished as Single Drum unit and equipped with large front tires and dual rears. For servicing to 3,000′.

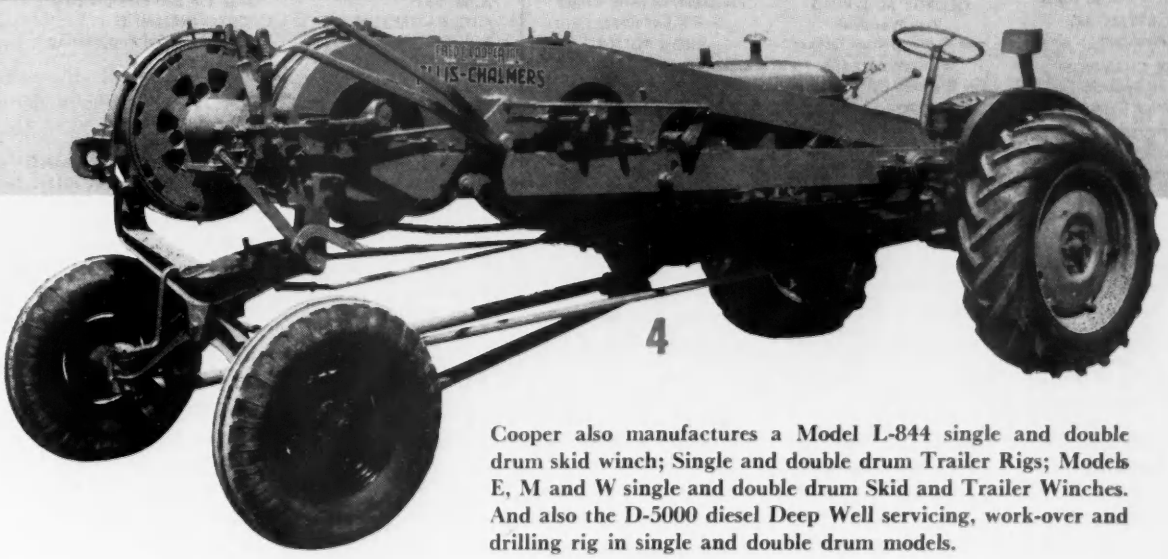
SERVICING and DRILLING Costs



3

CONDENSED SPECIFICATIONS

MODEL	MAX. LINE PULL	LINE SPEEDS	LINE CAP.	BRAKE SIZES	ROAD SPEEDS
(1) Model L-844	51,000 lbs.	8 from 39′ pm to 1116′ pm	11,500′ of ¾″ 8,600′ of ¾″	Optional 52″ x 10″ 42″ x 8″	18 m.p.h.
(2) Model E-563	48,200 lbs.	8 from 37′ pm to 883′ pm	4,690′ of ¾″	36″ x 6″	Optional 15 m.p.h. 30 m.p.h.
(3) Model M-318	30,300 lbs.	8 from 38′ pm to 1030′ pm	4,800′ of ⅝″	32″ x 6″	Optional 15 m.p.h. 30 m.p.h.
(4) Model W-201	16,700 lbs.	8 from 52′ pm to 866′ pm	3,300′ of ⅝″	26″ x 5″	15 m.p.h.



4

Cooper also manufactures a Model L-844 single and double drum skid winch; Single and double drum Trailer Rigs; Models E, M and W single and double drum Skid and Trailer Winches. And also the D-5000 diesel Deep Well servicing, work-over and drilling rig in single and double drum models.

Before you buy a unit for Well Servicing, Work-over and Drilling be sure to see the COOPER–ALLIS-CHALMERS Line.

Regardless of the depth of wells, there is a Cooper–Allis-Chalmers Winch of the right capacity to do the job economically.

FRED E. Cooper, Inc.

P. O. Box 1890 TULSA, OKLA.

Houston, Odessa, Los Angeles

Western Canada: Rocky Mountain Supply Co., Ltd., Calgary, Edmonton, Redwater

The Second National Bank of Houston

HOUSTON, TEXAS

CONDENSED STATEMENT OF CONDITION AS AT THE CLOSE OF BUSINESS DECEMBER 30, 1950

RESOURCES		
CASH	$75,365,109.37	
UNITED STATES SECURITIES	55,208,740.20	$130,573,849.57
Municipal Bonds and Other Securities		5,455,551.27
Loans and Discounts	80,088,120.47	
Commodity Loans	15,011,088.00	95,099,208.47
Second National Bank Building (Unincumbered)		1,500,000.00
Future Banking Home Site		785,000.00
Other Real Estate		1.00
Vaults, Furniture and Fixtures		1.00
Interest Accrued on Investments		548,772.28
Customers Liability Under Letters of Credit		13,446,073.18
Customers Liability Under Acceptances		2,662,691.70
Other Resources		23,435.59
		$250,094,584.06

LIABILITIES		
Capital	$5,000,000.00	
Surplus	5,000,000.00	
Undivided Profits	3,967,143.50	13,967,143.50
Reserved for Dividends		200,000.00
Reserved for Taxes, Interest and Other Purposes		1,173,759.79
Letters of Credit		13,446,073.18
Acceptances		3,266,409.44
DEPOSITS:		
Individual, Firm and Corporation	168,069,656.61	
Bank (Net)	45,383,989.09	
United States	4,587,552.45	218,041,198.15
		$250,094,584.06

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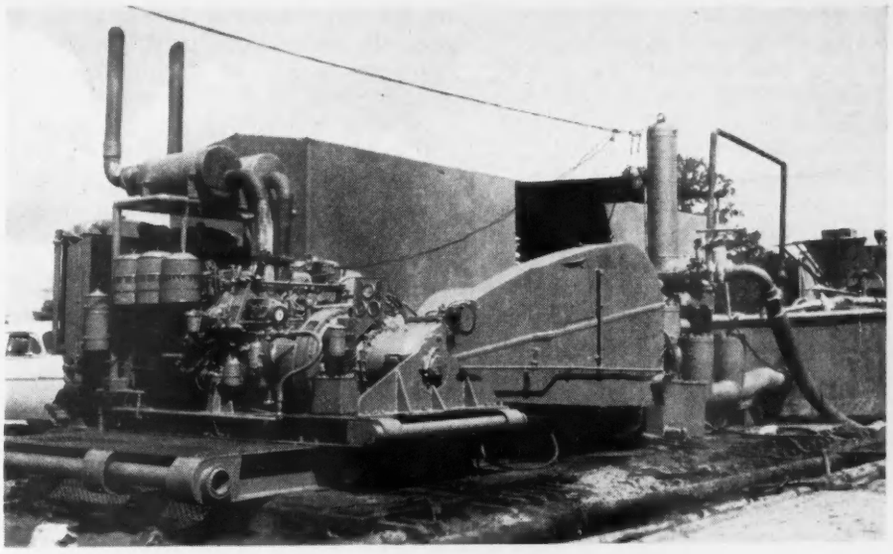
43 Years of Service to the Southwest

The SECOND NATIONAL BANK OF HOUSTON

MAIN AT RUSK

CAPITAL AND SURPLUS TEN MILLION DOLLARS . . . MEMBER F. D. I. C.

By W. S. CRAKE
Shell Oil Company
Houston



Torque converter drive coupled to high-speed diesel engines driving a 14-inch duplex pump.

NEW DRILLING EQUIPMENT

Offered Industry in 1950

Surface Equipment

TORQUE Converter Slush Pump. There has been some hesitancy in the acceptance of the converter drive for rig slush pumps. This has been due to the unwillingness of pump manufacturers to impose the high torque multiplication on pump power ends for fear of materially reducing the life, or causing premature failure, of piston rods, bearings and gears. In spite of this, however, a number of progressive thinking operators are going ahead with their own designs of torque converter driven pumps and a number of reputable manufacturers are offering rigs with the pump V-belt drive taking off from a converter driven compound.

Theoretically, it can be shown that with the proper liner size always in a pump, there is greater average fluid horsepower delivered by a pump for the same input horsepower using a mechanical drive than when using a torque converter drive. This, of course, is due to the greater efficiency losses in the converter. Granted, this is theoretically true. However, the practical consideration is, in the field, will liners be changed before their pressure rating is exceeded, causing the engines to lug down and deliver less than rated horsepower, and when liners are changed, will the proper size replacement liner always be selected? Experience has not shown this to be true; therefore, this theoretical horsepower advantage does not necessarily hold true. It is believed, therefore, considering average slush pump field operating procedure, that the torque converter pump with its requirement of fewer liner changes would actually have an average hydraulic horsepower delivery better than the mechanically driven pump.

Shell Oil Company has had in operation during the last year a 14-inch duplex pump with a torque converter drive. In 1800 hours of operation, more than 85,000 feet of hole has been drilled using this pump on wells to a depth of 6400 feet, with a single-sized liner, 7¼ inches.

For the particular engine chosen for this design, it was found that the manufacturer's rating was 260 horsepower at 1600 revolutions per minute, however, with the torque converter in the power train, the manufacturer stands behind higher speed operation,

CONTINUING DEMAND for gas and oil after the winter months of 1949-1950 brought additional efforts to drill and produce more efficiently. Some may say that the developments in a single year in industry are hardly recognizable, but a quick glance will tell differently. For the third straight year, the Houston Chapter, API, devoted its first meeting of the year to reviews of new developments in drilling and production methods and equipment. This article summarizes some of the significant developments in drilling during the past year. With the permission of the authors and the chapter, WORLD OIL again brings its readers these important discussions which were presented at the January 23, 1951, session.

1800 rpm, with larger fuel injectors, at which speed, rated engine hp is 350.

It was felt necessary to provide safety controls on the pump to prevent imposition of greater than the desired torques on the power end. Instrumentation to accomplish this purpose consisted of standard available air and hydraulic controls. This unit was designed to allow maximum input torque to the pump of twice the pump manufacturer's rating. It was felt that overloads of this degree were not dangerous due to the shock absorption characteristics of the converter and the reduced fly wheel effect of the sprockets used in the chain drive for this unit as compared to the larger V-belt pulley. Pressure and speed curves recorded for the torque converter driven unit and for a mechanically driven pump of the same size while circulating at the same depth show the improved load conditions imposed on the converter pump. The imposition of higher pressure peaks and wider cyclic variation from high to low pressure, as recognized respectively in greater impact loads and wider variation in applied forces in fatigue loading are apparent for the mechanically driven pump.

Hydraulic Torque Converters. The acceptance of the hydraulic torque converter drive by operators and drilling equipment manufacturers for use in the power train of servicing rigs and the smaller drilling rigs has been rather general. High starting torques for rapid aceleration of pipe string from standing starts, the availability of 80 percent or more of input horsepower during the majority of the hoisting cycle without engine lugging, the use of high-speed, compact, light weight engines facilitating rig moving and building, and the requirement of fewer mechanical speed ratios when using a properly geared converter rig have made this application of torque converters particularly advantageous.

It has only been recently that torque converter rigs of the greater depth capacities have gained any popularity. From the number of rigs currently in use and those sold during 1950 in the 700 to 1100 hp class, this popularity is now, however, apparent. One prominent rig manufacturer has sold nine two-speed rigs in this horsepower group during the last two years. Also, it is reported that one 1700 hp torque converter rig is already in service. Currently being constructed for a major company for use on the Pacific Coast is another converter rig of the same capacity.

Slush Pump Pulsation Dampeners. These devices, on which experimental work has been done over several years, are finding increasingly wide use on slush pumps—particularly power pumps.

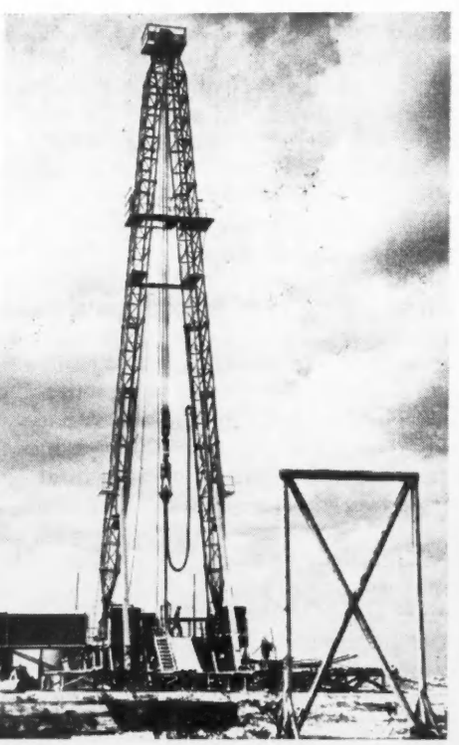
Several manufacturers offer field devices, but a considerable amount of trouble has been experienced in making the rubber envelopes retain gas charges and in preventing these charges from leaking. The dampener can increase valve, piston and liner life, reduce maintenance on mud hoses, etc., and reduce vibration and fatigue in the derrick, wire lines, drill pipe, etc. On drilling, using lightweight on bits, or in fishing, they can improve operation and life of bottomhole tools considerably.

In conjunction with supercharging of slush pumps, hydraulic or electric drives, they can enable higher mean loads to be carried by a given pump. Since this higher load may be from 50 to 100 percent, the cost of the dampener, converters and drives is rapidly paid for in reduction of purchased slush pump horsepower, transportation, etc.

Automatic Drilling Controls. During 1950, a greater number of automatic drilling controls have been placed in operation, as far as the author has been able to determine, than in all previous years combined. There are now about 50 in operation and their acceptance as a major means of increasing bit life appears certain. They have also resulted in reduction in round trips and rig wear and tear, and greater penetration rates. Life increases of 15 to 50 percent have been recorded on ordinary bits and from 50 to 200 percent on diamond bits.

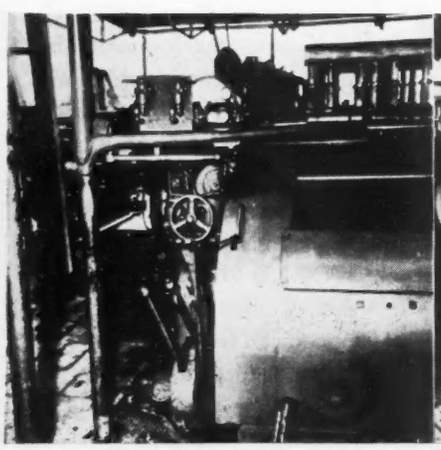
There are five makes of controls now offered for sale, costing from $7500 to $15,000 and of varying degrees of development and desirability. One control, the simplest type, is in great preponderance in proven use, totaling about 80 percent. Operators should be careful in selecting controls to be sure they purchase a practical device which is not still "experimental" to a major degre, unless they wish to help experiment toward better controls.

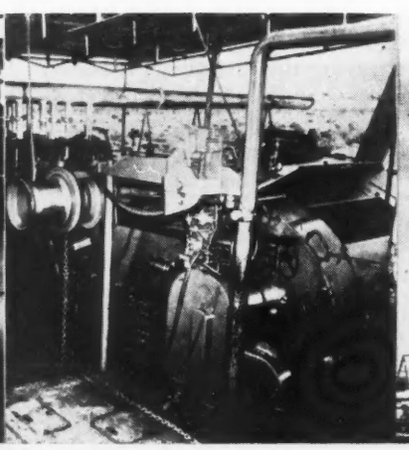
Full-View Drilling Mast. A revival of the latticed box-type A-frame mast



BELOW: Control mechanism for automatic drilling device developed and put on the market during 1950. The acceptance of automatic controls as a major means of of increasing bit life appears certain.

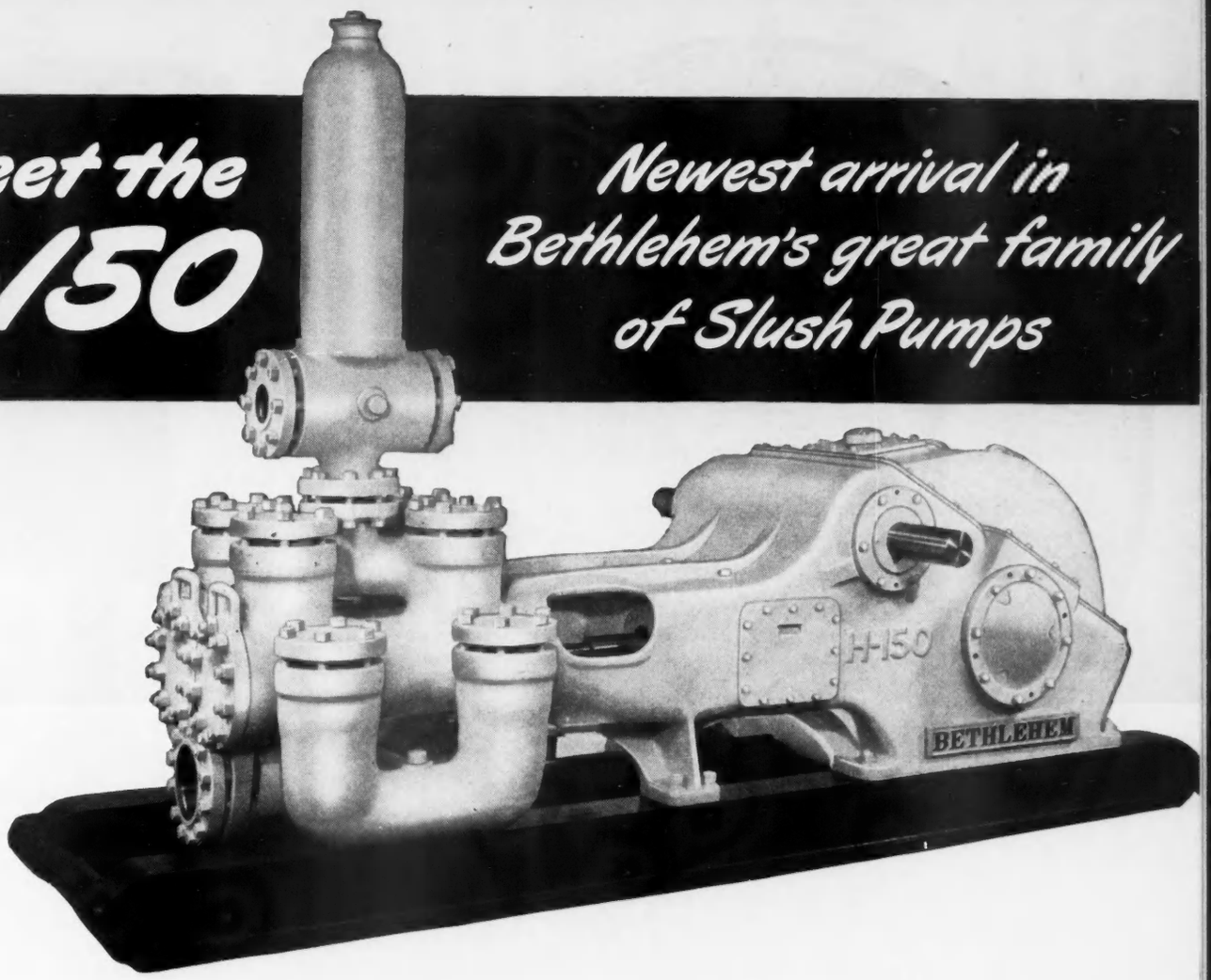
RIGHT: Considerable free floor space, full view for the driller and crew and a novel method of lifting are features of this 1950 development in derricks.





Meet the H-150

Newest arrival in Bethlehem's great family of Slush Pumps



Here's a sturdy little fellow that's built for plenty of man-sized work. It's Bethlehem's brand-new H-150 Pump — a unit designed for shallow drilling assignments to 4,000 ft. You'll find it perfect, too, for mud-mixing or lease gathering chores.

The H-150 has features usually found only in larger, more expensive pumps. Note, for example, these eight major points:

- Pulley extension on both sides for right- or left-hand drive
- 100 pct oil-bath lubrication
- All-steel fluid end that more than meets ASME specification for unfired pressure vessels of its size
- API metal ring gaskets for valve covers, stuffing-box housing flanges, discharge flanges, and strainer-housing flanges
- Tell-tale hole that protects fluid end from washouts if packing fails
- Alloy-steel gear made from rolled seamless forging
- Alloy-steel pinion integral with shaft made from heat-treated forging
- Roller bearings throughout, including double tapered-roller type at main bearings and crank-throw end of connecting rods to reduce shock on the crankshaft

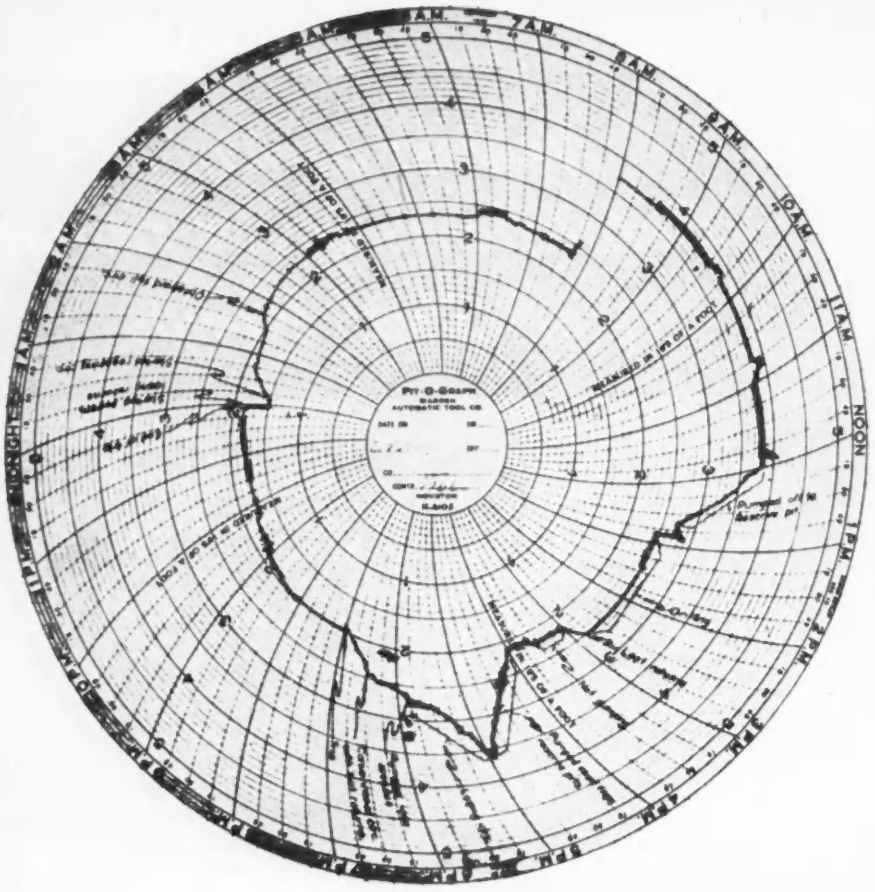
Ask to see and study the H-150. For customers fussy about the engineering they buy, this rugged little pump has everything!

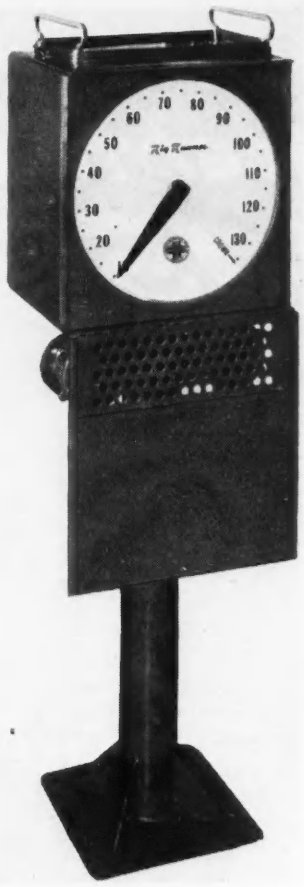
SPECIFICATIONS

Bore and Stroke	7¼ in. x 12 in.
Maximum Input BHP @ 70 RPM	191
Maximum Working Pressure	1,185 lb
Gear Ratio	5.536 to 1
Weight less Skids	16,500 lb

BETHLEHEM SUPPLY COMPANY
General Offices: 21 E. Second Street, Tulsa, Okla.
Subsidiary of Bethlehem Steel Corporation
On the Pacific Coast Bethlehem Oil-Field Equipment is sold by Bethlehem Supply Company of California
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL





LEFT: Mud pit level indicators aid the driller in detecting lost circulation zones, high pressure zones and the swabbing effect when withdrawing the pipe. During normal drilling operations, the V-notches on the chart indicate a loss of fluid in the system, while the peaks show a gain in fluid. These indications warn the driller far in advance of blow-outs or lost circulation troubles.

RIGHT: Front view of a new drilling time instrument which tells the driller the position of the travelling block at all times.

which was used on an all-electric rig belonging to a major company on the West Coast several years ago was seen in the new 133-foot mast marketed this year. This mast, with no girts or braces obstructing the driller's view of the travelling block and derrick man offers very good visibility. This construction also offers considerable free floor space for equipment installation and safe working conditions.

The mast has a novel raising mechanism. One end of each raising leg is pinned to the substructure at ground level and the other end is fitted with rollers that ride in tracks on the inside of the mast legs. The mast is raised by the pull exerted on the legs by lines which are yoked to the hook. As the traveling block is raised, the lines pull the legs inward and the rollers move downward along the track, tilting the mast upward.

Boilers. The field test of the three 300-hp coil type, water tube boilers conducted in Louisiana and described in last year's drilling review of this chapter, has been concluded. The boilers have continued in regular operation and the rig with which they are used is presently drilling below 10,000 feet in a third well.

Test results, using natural gas as a fuel, showed that one boiler can produce 15,000 pounds of steam hourly at 500 pounds per square inch working pressure and 20° F. superheat, or as much as 29,000 pounds hourly of dry, but not superheated, steam at 500 psi. Average thermal efficiency of 80 percent was obtained compared with about 65 percent for heavily-lagged regular fire-tube boilers.

A test using bunker "C" fuel oil was attempted but was discontinued due to "coking up" of the burners. The manufacturers have a new design of oil burner which has shown good promise in factory tests but has not been field tested. Development of a suitable oil burner will go far toward making the boiler available for general use.

Mud Pit Level Indicators. An instrument for indicating and recording variations in level in the rig mud tanks has advantages as an aid to the driller as an immediate indicator of the following:

- High pressure gas oil or salt water flows recognized by increases in mud level.
- The presence of lost circulation zones recognized by decrease in mud level.
- The swabbing effect, or change in effective hydrostatic head on the formation occurring during withdrawal of drill pipe from the hole, recognized by increase in mud level.

The early detection of these conditions is important since, by taking rapid remedial action, the expense of combatting these problems is considerably lessened, as is the danger of losing the well and the hazard to personnel and surface equipment.

At least two companies are presently offering pit level instruments which have proven reliable in service. In actual operations, these instruments are credited with the saving of considerable mud costs and lost rig time.

Charts with the sequence of events recorded will show an indication of (a) lost circulation, (b) a salt water flow and (c) a high-pressure gas kick. In addition to the recording chart, each of these instruments is also equipped with an audible and visual alarm system, adjustable from the driller's position, which warns him of any predetermined variation in mud level.

Drilling Time Recorder. This instrument is a useful, safety device, providing an adjustable automatic mechanical signal to indicate when

LeRoi 600hp L-3460

EVERYTHING YOU ASKED FOR IN AN ENGINE

The L-3460, with its 600 maximum horsepower, is designed and built to meet oil-field demands for more power.

Its fast acceleration, wide speed range, lugging power at slow speeds, and compactness make it outstanding for drill-rig applications.

Its dependability and economy under continuous load, its space-saving size for easy installation, and its accessibility that simplifies maintenance give you an unbeatable power unit for any type of oil-field application — drilling, pipeline, generator drives, etc.

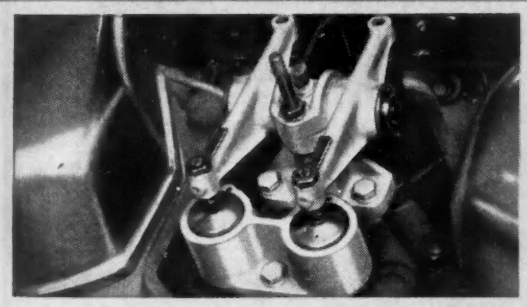
Here, in the L-3460, you have oil-field power at its best — wide speed range from 600 to 1350 rpm, and horsepowers from 350 to 600. If you want to keep a tight rein on costs, nothing but the best will do. So let the L-3460 go to work for you now — it's everything you asked for in an engine. For further information, see your Le Roi distributor — or write for our new bulletin E-3.

LE ROI COMPANY

MILWAUKEE 14, WISCONSIN

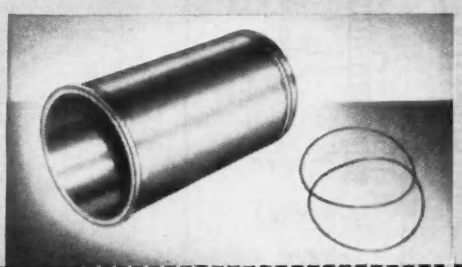
Plants: Milwaukee — Cleveland — Greenwich, Ohio • Oilfield Headquarters: Tulsa, Oklahoma

Easier Maintenance—Lower Costs



Valve-in-head design lets one man remove cylinder heads without disturbing manifold, carburetor, or controls.

One-piece crankcase and cylinder construction provides unusual rigidity — prevents misalignment. The L-3460 is built to take the punishment of oil-field handling.



Replaceable cylinder sleeves do away with costly reboring and expensive oversize parts.

P-106

SERVICE AND SALES FACILITIES IN EVERY PRODUCING AREA

LEADS THE FIELD

Le Roi Oilfield Sales

Oklahoma
Le Roi Company Branch — Tulsa
Carson Machine & Supply Co.— Oklahoma City

East & South Texas, Gulf Coast
Southern Engine and Pump Company — Houston, Kilgore, Edinburg, Dallas, San Antonio, Corpus Christi, Texas, and Lafayette, Houma, Louisiana.

North & West Texas, New Mexico
General Machine & Supply So. — Odessa, Snyder, Texas.
Nortex Engine & Equipment Co.—Wichita Falls, Texas.

Kansas
Carson Machine and Supply Co.—Great Bend

Illinois — Western Kentucky
Western Machinery & Engine Company—Centralia, Illinois and St. Louis, Missouri.

LE ROI

IN THE FIELD . . .

Service Network

Michigan
Hafer Engine Service — Reed City

Rocky Mountain Area
Gehring Equipment Co. — Casper, Wyoming, Rangely, Col.

Northern Louisiana & Mississippi
Ingersoll Corporation — Shreveport, Louisiana, and Jackson, Mississippi.

West Coast
Le Roi-Rix Machinery Co. — Los Angeles, Long Beach and Bakersfield, Calif.

Appalachian Area
P. C. McKenzie Co., Pittsburgh

Canada
Lucey Export Ltd. — Calgary, Edmonton, Alberta.

the engine throttle should be shut off and also another signal to indicate close approach of the blocks to the crown.

It also has a recorder which gives a full record of both round trips and drilling operations and can be used for logging or time-penetration purposes. By employing a two-speed or a high-speed clock to give suitable spreading of the round trip, detailed engineering time studies of round trips can be made which are invaluable for research and rig design purposes.

Air-Operated Weight Indicator. An air-operated weight indicator and weight-on-bit indicator, using a null balance air system on the dead line, has been introduced. The signal from this is temperature proof and can be used for operation of automatic drilling controls. A system of this type was used by the author three years ago in an effort to overcome the deficiencies of temperature effcts on then current weight indicators, when operating automatic drilling controls.

Eddy Current Clutches. One rig in Mississippi was equipped in 1950 with Eddy current clutches. These operate on the same basic principle as the dynamatic brake except that both the coil holding and plain rings rotate as in the fluid coupling. Its advantages claimed over conventional friction clutch plus fluid coupling are its practically instantaneous torque control, wide range constant torque characteristics, etc.

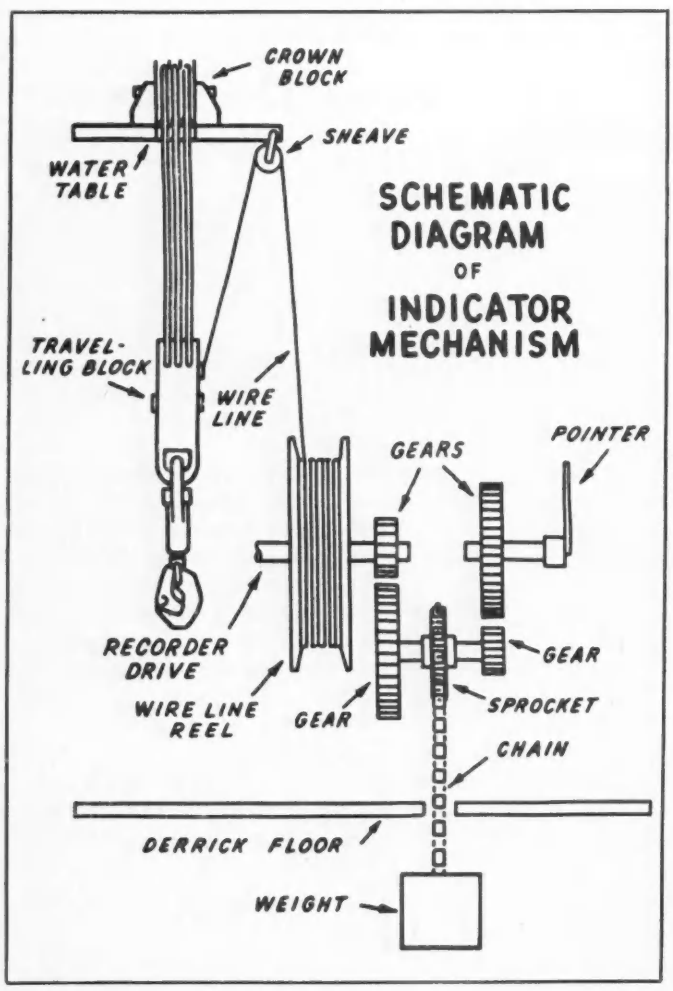
Excitation is set so that no torque is transmitted by this clutch at idling speed. An idler brake or other transmission stopping device is needed to "kill" the transmission shafts.

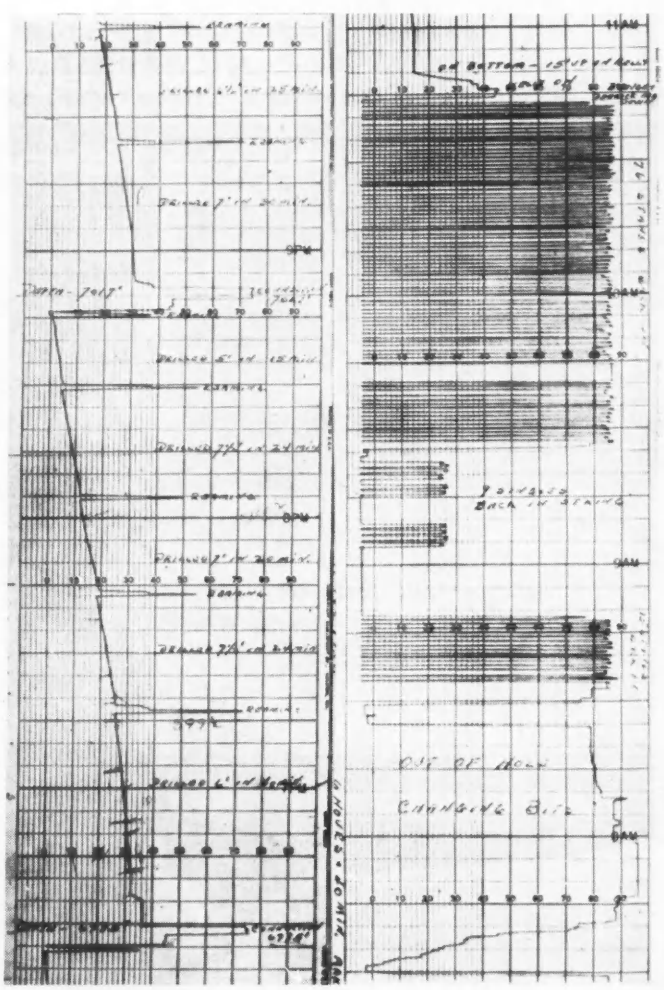
Console Controls. An increasing trend has been noticed in concentration of all hoist, and often pump, controls in a single panel or cabinet. Generally, the cabinet is mounted on the drawworks at the driller's position.

The long need of the industry for a reliable remote-operated brake of suitable control quality has been met by at least two manufacturers. When this is generally available, the operator will be able to separate the hoist from the driller and place the latter where safety and visibility best requires. It will also save considerable sums of money in rigging up and substructures.

Remote operated brakes must be of the "fail safe" type which are full "on" in the event of operating power failure and must preferably be of a type in which motion of the brake handle produces a similar positive motion on the brake mechanism. Relatively long brake handles are needed to give enough control over close settings to the driller. A synthetic "feel" of resistance to the operating lever is also required to maintain the illusion now obtained on ordinary brakes. This latter, since it is tied to complex multiplying levers on ordinary brakes, is not proportional to brake power and the remote brake merely needs a spring, against which the driller pushes, to give a similar "feel" of pushing against the brake load.

Automatic Derrick Equipment. As an outcome of the work done by a major company on its "automatic drilling rig," a supplier has now developed power equipment for facilitating and accelerating the work of the derrick man. This equipment has





LEFT: Schematic diagram of the indicator mechanism of new drilling time recorder.

RIGHT: Example of records made by the drilling time recorder. Sloping line on record at left is a function of the rate of penetration and from it the penetration rate can be determined directly. The chart at right is a complete record of running the bit back in the hole, and shows the number of singles and thribbles run in.

Spindletop . . .

SYMBOL OF AN INDUSTRY THAT *changed the course of the world*

The Golden Anniversary of Spindletop commemorates 50 years of progress . . . 50 years that challenge the imagination. Spindletop signifies a growth unsurpassed by any comparable industrial development in the United States. Its discovery marked the dawn of a new era in oil production—the fuel oil era—and the dawn of a rich, new way of life for the world.

The fundamental reason for the phenomenal growth of the oil industry has been multiple but distinctly individual effort. This is signified by the large number of oil producing companies which have operated independently through the years. The relatively free economy of the industry is more important today than ever before.

SCHLUMBERGER

Schlumberger is proud to have contributed to, and been a part of, the industrial development resulting from the Spindletop discovery.

SCHLUMBERGER WELL SURVEYING CORPORATION • HOUSTON

been in use for some time and is apparently quite successful.

Power operated stabbing boards have been proven practical and economical on deep casing jobs. These allow the stabber to position himself by a power device so that he is always in the right place for stabbing pipe and applying elevators.

Safety Color Code. The work of the American Association of Oilwell Drilling Contractors and oil companies has resulted in the adoption of a safety color code for use on drilling rigs. Details on this excellent proven method of reducing accident possibilities may be obtained from the association.

Subsurface Equipment

Hydraulic Pulling Tools. Use of the hydraulic pulling tool has gained widespread acceptance as a means of recovering liners, production packers, sanded up tubing and other fish. As an illustration of the interest which has been shown in the relatively new tool, one Texas Gulf Coast workover contractor reported that he has performed in excess of 100 hydraulic pulling jobs for various operators.

There are now at least four service companies offering their designs of this tool, three of whom entered this specialized field during 1950. The tools available can be run in casing sizes from 5 to 9⅝ inches and have multiplication factors of from 30 to 1 to 90 to 1. This multiplation factor refers to the ratio of the pull exerted on the fish in pounds to the applied pump pressure in psi. Thus, a tool with a 90 to 1 ratio could exert a pull on the fish of 270,000 pounds with a pump pressure of 3000 psi.

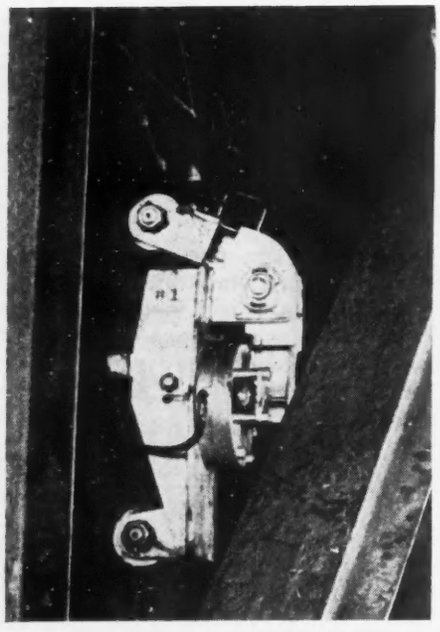
It is evident, then, that the hydraulic pulling tool may effect a lifting or jacking force upon a fish many times greater than is possible or practicable with a hoist and fishing string in the conventional manner. Also, when using such a tool, only a light well servicing hoist and mast of sufficient size and capacity to handle the weight of the fishing string is required. Records indicate that liner pulling jobs, where no unusual difficulty has been experienced, have cost as little as $1000. This figure includes the cost of fishing tool attachments, freight, service operator's time and expenses, as well as rig time.

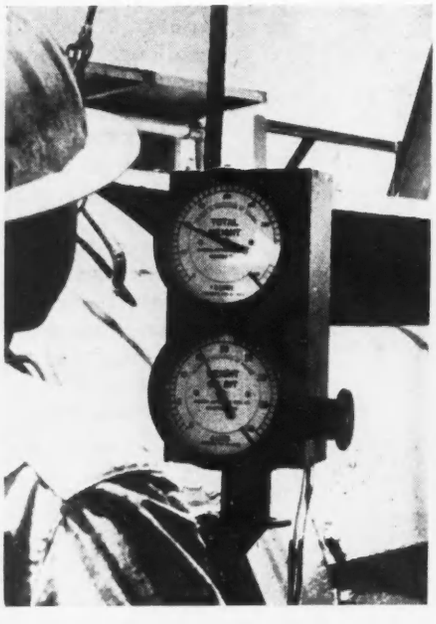
Perforating Guns. The use of jet perforating guns has increased greatly in the past year due, in part, to improvements made in both the guns and charges. The problem of leaving debris in the hole has been attacked vigorously with notable success. One company has eliminated the port seals in the charge carrier (the source of most debris) by providing a charge totally enclosed in a glass case which is reduced to fine sand when the charge is fired. Another company has concentrated on the development of an improved seal, most of which stays in the carrier, thereby practically eliminating debris.

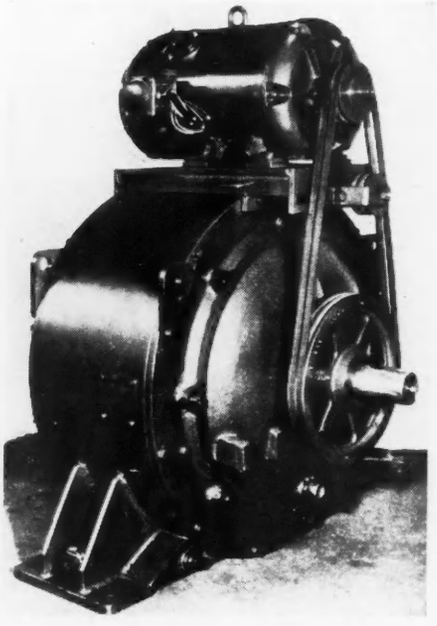
Considerable discussion has taken place concerning the advantages or disadvantages of the types of charge carriers used, that is, hollow, solid and strip types. Experimental comparative shooting has indicated that the solid and strip-type guns show more tendency, than does the hollow type, to swell or bulge casing unsupported by cement, and to produce irregularly shaped split holes. Comparative effects on casing solidly encased in cement, have not been determined, as far as we know, but it would seem logical to assume that the solid and strip types would produce greater shattering of the cement sheath than would the hollow type.

Whether this shattering effect is always a disadvantage is presently open to question. This whole problem needs much more investigation.

Percussion Drilling. During the past year, a considerable amount of development work has been done on the mud engine type of percussion drill and approximately 10,000 feet of hole was drilled. The general trend has been to decrease the weight of the reciprocating hammer and also to increase the oscillating frequency of the hammer. Tests of such design changes have produced encouraging results when drilling Permian limestone and dolomite. Percussion drilling in hard friable formations such as chert and granite has continued to show considerable advantages over conventional drilling. Actual test results have shown the penetration rate increase in chert to be as great as 100 percent and the life of the bit was prolonged as much as 200 percent. The hole straightening ability of percussion





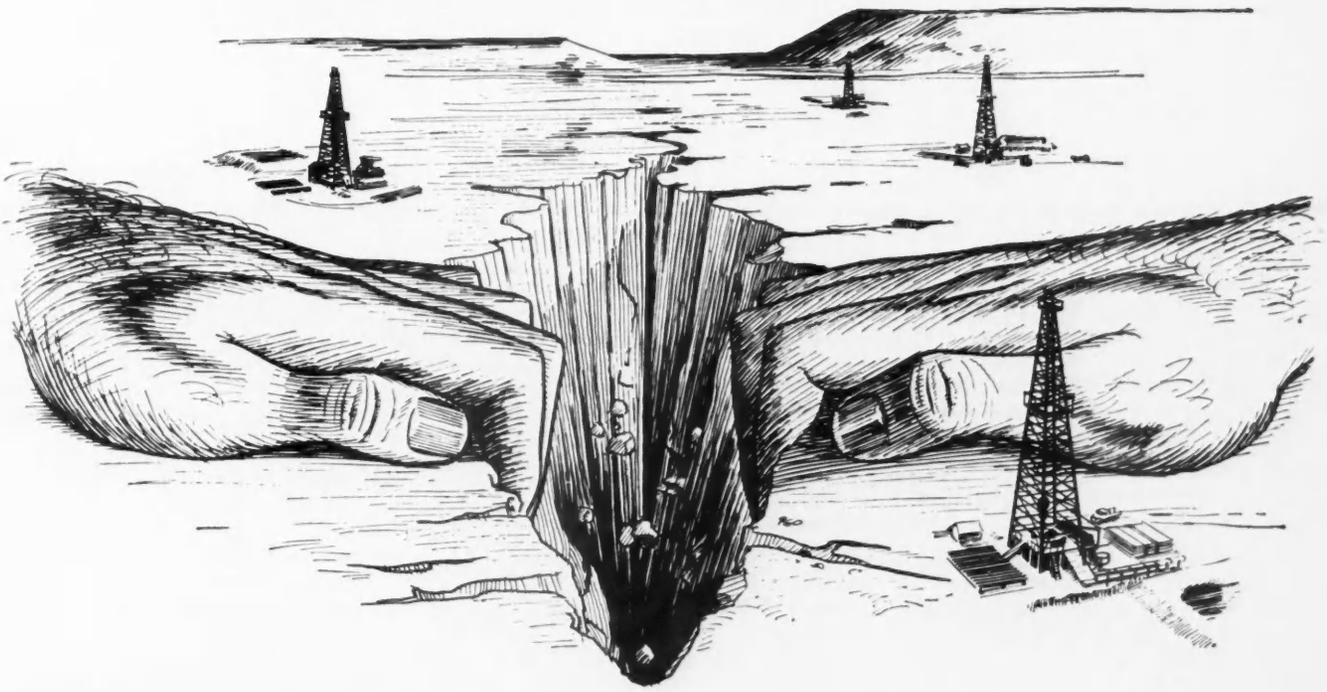


LEFT: Dead line attachment of the air-operated weight indicator. The signal from this instrument is temperature proof and can be used for operation of automatic drilling controls.

CENTER: Mounted on the drawworks is the weight indicator of the air-operated device. Two dials give the driller the total weight on the line and the weight on the bit. These two values are also recorded on a automatic recording device.

RIGHT: The newly-introduced Eddy-Current clutch operates on somewhat the same basic principle as the dynamatic brake. Its torque characteristics cover a wide range.

after discovery... watch your reservoir!



After discovery, it's a wise operator who *really knows* his own reservoir.

Each newly discovered field presents its own unique productive tendencies which must be carefully analyzed and exploited if the operator expects to obtain *maximum* ultimate recovery.

How do you initiate this controlled reservoir performance?

Begin with Core Lab's comprehensive Reservoir Fluid Analysis of bottom-hole samples taken from key discovery wells. These data (pressure-volume-temperature relationships of oil and its dissolved gas, measured in the *early* life of the reservoir) can then be combined with formation basic characteristics

- ***to estimate, with reasonable accuracy, the quantity of oil in a particular reservoir and the amount you may expect to recover;***
- ***and to aid in selecting procedures best suited to produce those recoverable barrels.***

In short, obtain *maximum reservoir revenue* through Core Lab's Reservoir Fluid Analysis.

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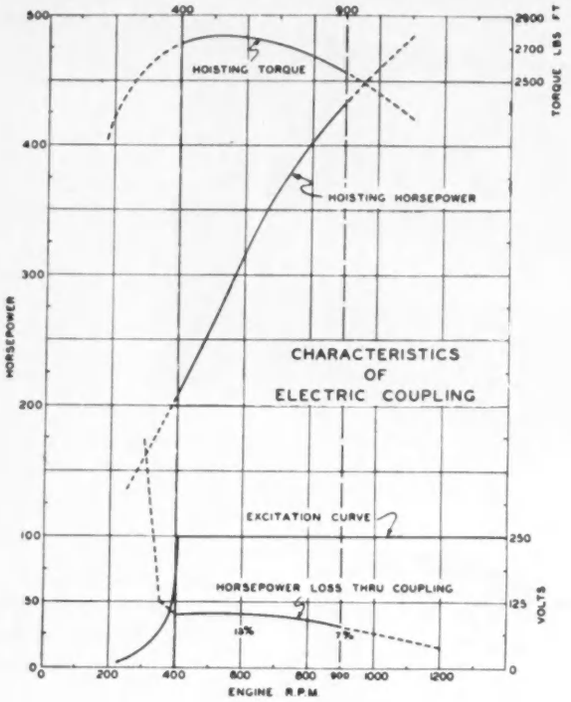
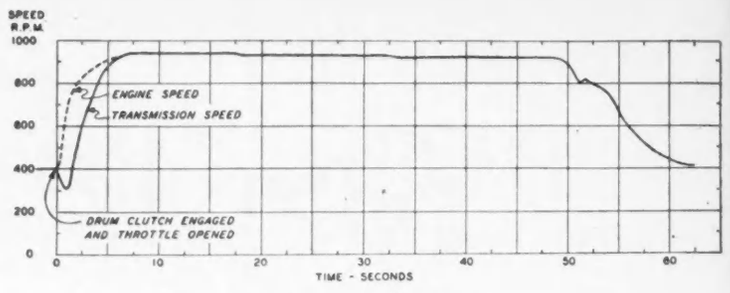
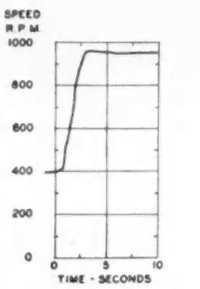
PETROLEUM RESERVOIR ENGINEERING




SPEED R.P.M
ENGINE SPEED
TRANSMISSION SPEED
DRUM CLUTCH ENGAGED AND THROTTLE OPENED
TIME - SECONDS
HOISTING 12,000' - 4½" DRILL PIPE
10 LINES - LOW D.C. & 2ND
EMSCO J-1250 DWWKS. - 3 PTD 8 ENGINES N.A.



Acceleration Curves
Electric Coupling

LEFT: Characteristic curves of the electric coupling introduced in 1950. Note that the hoisting torque from 400 to 900 revolutions per minute varies only slightly.

RIGHT: Acceleration curves for the Eddy Current electric coupling.

tools which employ small bit preloads has yet to be established. However, one tool which does not employ preloading is being tested and the use of this tool as a hole straightener appears encouraging.

The design of bits for use on percussion drills has also progressed within the past year. The most preferred bit at this time is one of two or three cone design which is constructed with journal bearings. Gauge edge wear when drilling in chert still presents a problem and, as yet, attempts to alter the design of previously tested bits have produced little or no result.

Subsurface Practices

Jet Bits. A considerable amount of additional work has been done in 1950 on the development of "jet bits," mainly on rock bits. It is felt that this development is still in its early stages and a number of suppliers and companies are attempting to evaluate the proper use of these bits. Increases of over 100 percent in penetration rates have been recorded in certain specific cases and longer footage life to bits has been achieved. The chief problem at this time is the limited space geometrically available in bits for accommodating the jet tubes.

Fundamentally, the function of the jet in hard drilling is to remove cuttings from under the bit teeth and thus avoid recutting which destroys effective bit life and reduces the efficiency of the true bit tooth action.

On one major company rig during 1950, jet fishtail drilling resulted in a record of 2570 feet of 9⅞-inch hole being drilled in one eight-hour tour.

Drill Collar Standards and Operation. During 1950, The API Drilling Equipment Committee, working closely with contractors, companies and manufacturers proposed a list of standard stock drill collar sizes and bores to simplify stock and manufacturing problems and thereby reduce the costs. Work is under way on standardizing drill collar joints based on the practices and results of the enormous amount of work done in West Texas in the past few years.

It is hoped that the joints will be chosen for their suitability for the drill collar job rather than because API has a tool joint which is approximately the same size.

The past year has seen a steady improvement in field operating practices which has resulted in reduced drill collar troubles where properly applied. Welded drill collars, consisting of hollow forgings joined by welding, have been increasingly used and without field trouble. In sizes up to 6¼ inches, full-length, hollow-forged collars are available.

Wire Line Drill-Stem Testing Tool. A major cementing company has in the experimental stage a testing tool which will run in a core barrel and which can be retrieved with a wire line. A rat hole is made with a small bit on the tool and a packer above the bit is then seated in the rat hole. A small sample—1½ to 2 gallons—is obtained from the formation, and a pressure recording made. Most of the experimental work has been done in the Corpus Christi area, the tester having been run 10 or 12 times, successful runs being attained about 80 percent of the time. In two instances, where the tester indicated dry formations, results were corroborated by drill-stem tests. So far, the tool has been run only in one type of core barrel, but it is anticipated that the tester will soon be redesigned for universal application.

Cementing Practices. The cementing of casing has continued to receive careful study. In addition to further investigation of the mechanical phases, considerable attention has been given to employment of additives in the cement slurries.

There has been a steady increase in the use of scratchers and centralizers. At present, practically all major operators use this technique as standard practice on production strings, and quite often utilize it on intermediate strings and surface casing. The advantages of this method have been recognized by the independent and

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Leland Equipment Company, Oklahoma City
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Western Equipment Co., Portland
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PENNSYLVANIA
Doerr Brothers, Inc., Pittsburgh
Eastern Body Company, Philadelphia
Trailco Mfg. & Sales Co., Hummel's Wharf

SOUTH DAKOTA
Pecaut Industrial Supply Company, Sioux Falls

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Martin Machinery and Supply Company, Nashville
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smaller operators, too, and they are adopting it in increasing numbers. The results attained—fewer primary cementing failures, and fewer squeeze jobs during recompletions in shallower formations—leave little doubt as to the value of the technique. No complete record is kept of the number of wells in which scratchers and centralizers are used, but one large manufacturer of these items estimated that, in 1950, more than 2000 wells were so equipped in the territory covered by the Southwestern District of The API. He also advised that the average number of scratchers per well is 50, the average number of centralizers is 8, and the average footage covered is 600.

Scratcher design did not change greatly during the year except that the hinged type became generally available making for somewhat greater ease of application and eliminating the necessity of welding split scratchers shut after application. Centralizer design received much more study and a number of new ideas and improvements made their appearance.

The practice of adding gel to cement gained in popularity. Not only was more cement containing gel used, but the percentage of gel in the slurry was increased. For the most part, this entailed an increase of gel percentage from 2-4 percent to 4-6 percent, but some special work was carried on which indicates that, under certain conditions, a 14 percent gel mixture is advantageous. This 14 percent mixture presently is attained only with common cement in which a special dispersing agent is used. Results of using the available commercial slow set cements were too erratic for practical application. Some of the reasons cited for use of the 14 percent mixture are: (a) ease of perforation of the cement sheath; (b) it is the highest percentage which can be used and still obtain high enough compressive strength; and (c) it gives maximum fill-up for money spent.

The last year has seen an increase in the use of processed perlite both as a lost circulation material and as an aggregate in cement slurries. In the latter case, the material acts not only to prevent lost circulation but also to lighten the weight of the cement column. Slurry weights in the neighborhood of 11 pounds per gallon may be obtained. The material also has been used as a plugging agent in squeeze cement operations. While the product is distributed and has been used to some extent throughout the Gulf Coast region, the greatest use of it has been made in West Texas. There are several brands of the material offered, differing somewhat in characteristics, and the operator has to determine whether the one selected is satisfactory for the conditions expected to be encountered.

Drilling Fluids. The outstanding feature in this field in 1950 was the completion by The API National Subcommittee on Drilling Fluids of the Third Edition of the code for field tests of drilling fluids.[1] It will be recalled that the Second Edition was issued in July, 1942. An extremely useful appendix covering the laboratory evaluation of drilling-mud materials is included with the new code.

Work with lime-treated muds continued throughout the year. It can be said, as a generality, that they are being used all over the world wherever weighted muds are required. Further, their use where anhydrite is to be drilled or for certain types of salt drilling increased through the year in the U. S. and Canada. The understanding and control of these muds has been greatly advanced by three papers published during the year by Goins,[2] Battle and Chaney[3] and Nelson and Watkins.[4]

The use of oil emulsion muds has greatly increased this year. The understanding of these muds has been advanced by two papers published late in the year by Weichert and Van Dyke[5] and Van Dyke.[6] At the end of the year it was clear that these muds, in addition to giving lowered torque and pipe drag, were actually, under some conditions, giving longer bit life, faster drilling rates and lowered circulating pressures. These advantages seem to stem from differences in "shale wetting" between the oil emulsion mud and ordinary mud. Thus the lowered torque and circulating pressure can be attributed to a cleaner hole and drill stem because the formations do not ball up. The faster drilling rates in shale are due to the clean bit surfaces and the longer bit life to better bearing lubrication and much less cone-locking.

Diamond Drilling. A continued expansion of the use of diamond coring took place during 1950. Of particular interest and as an illustration of the possibilities of this tool is the well being drilled in Mississippi by George Vasen. This well was last drilling below 19,800 feet and from 14,450 feet had been continuously cored with diamond bits in a 5¾-inch hole. An oil-base mud has been used since 14,670 feet. An average of more than 1000 feet per diamond core bit has been obtained.

With more than 5000 feet of 5¾-inch x 3-inch core, using 2⅞-inch drill pipe and a typical 10,000-foot steam drilling rig, the achievement is phenomenal and certainly points out the possibilities of drilling deep exploratory wells in rock formations with much smaller tools and rigs than are usually employed.

About the Author

W. S. (BILL) CRAKE has had slightly less than a quarter of a century's experience in the oil industry in both drilling and production work. Born in Bulawayo, Southern Rhodesia, South Africa, and a graduate of Loughborough College, Leicestershire, England, with a degree in electrical engineering, Crake joined Shell in London in 1927 and has since been associated with that firm in various capacities. He moved to the Gulf Coast in 1939 after two years in Trinidad, B.W.I. Prior to 1947, was assistant chief mechanical engineer for the Texas Gulf area, and when Shell organized its regional offices in 1947, Crake was made chief mechanical engineer of the Houston area, which position he now holds.

REFERENCES

[1] "Recommended Practice for Standard Field Procedure for Testing Drilling Fluids," with Appendix, "Manual of Procedures for Laboratory Evaluation of Drilling-Mud Materials," API RP 29, 3rd Ed., May, 1950.

[2] Goins, W. C., Jr., "A Study of Limed Mud Systems," The Oil and Gas Journal, January 19, 1950.

[3] Battle, J. L., and Chaney, P. E., "Lime-Base Muds," API SW Dist. Meeting, March 9, 1950. In World Oil, April, 1950, and Oil and Gas Journal, March 16, 1950.

[4] Nelson, M. D., and Watkins, T. E., "Lime Content of Drilling Mud-Calculation Method," AIME Technical Note, Jrl. of Pet. Tech., July, 1950.

[5] Weichert, J. P., and Van Dyke, O. W., "The Effect of Oil Emulsion Mud on Drilling," Petroleum Engineer, November, 1950.

[6] Van Dyke, O. W., "Oil Emulsion Drilling Mud," World Oil, November, 1950.

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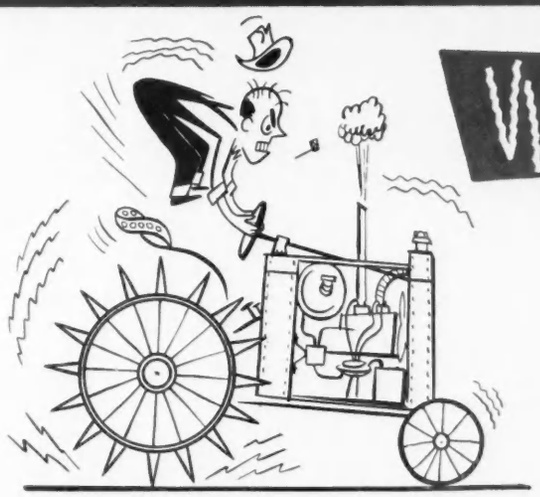

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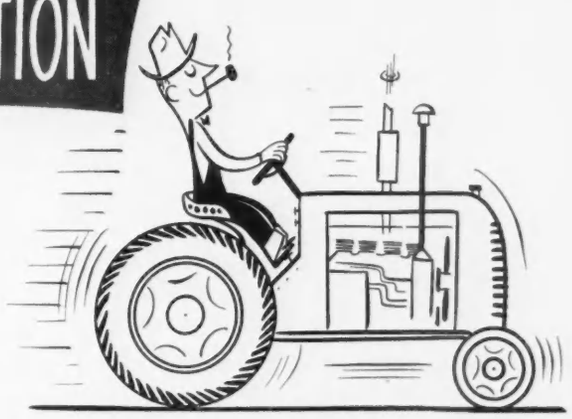

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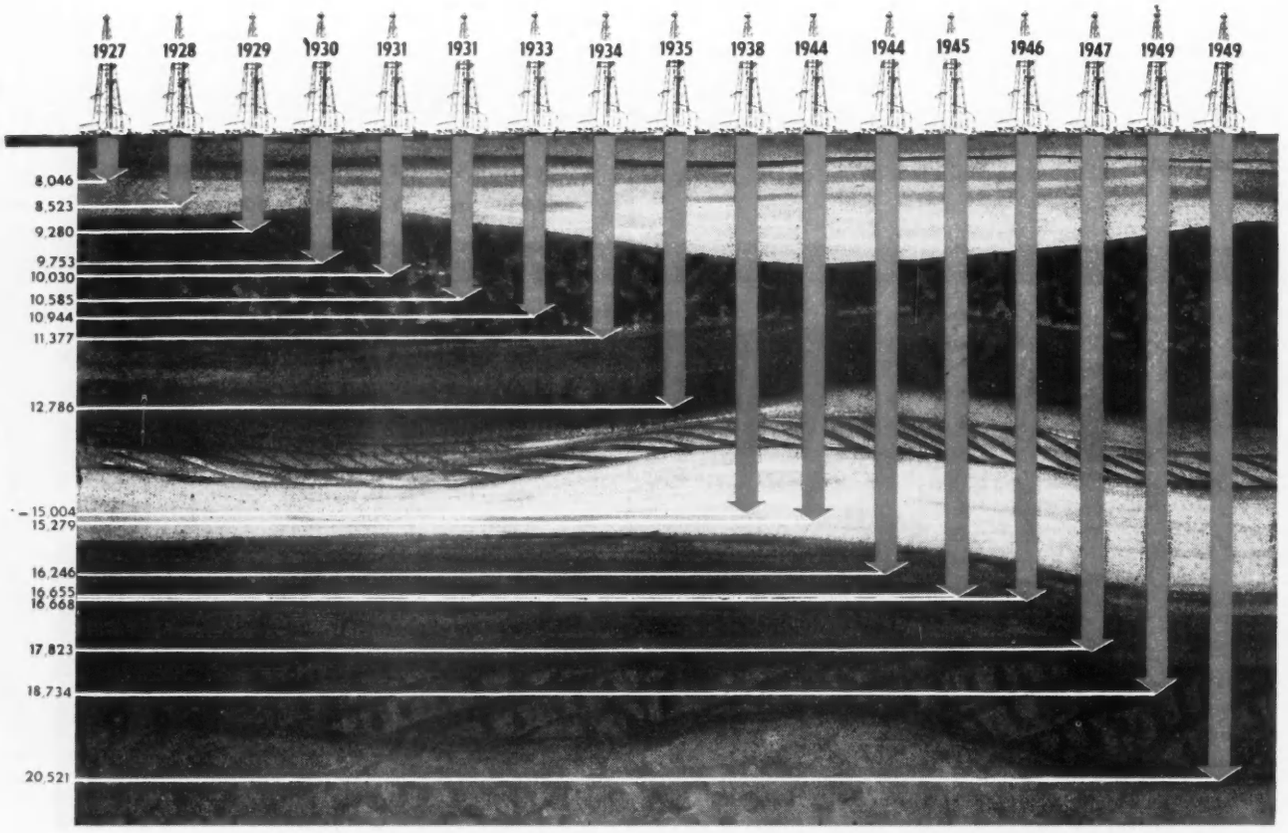
DRILLING DEPTH RECORDS

Bested in Eight Areas

ALTHOUGH drilling in 1950 was the deepest in history when all wells were considered, there was no individual well deep enough to break the record of 20,521 feet established the year before in Wyoming. However, a determined Mississippi operator's rig was churning away below 19,600 feet at year's end and with no indication of stopping short of a new national and world's depth record.

The Superior Oil Company of California's Pacific Creek wildcat in Sublette County, Wyoming, was drilled to 20,521 feet in 1949 and that record was good for another year. At the time that test was drilled it appeared that the mark would probably stand a long time. It may still be good for a long time to come, but a relative newcomer to the drilling industry was



(Includes both Dry and Producing Wells)

Year	WELL and LOCATION	Feet
1927	Chansler-Canfield-Midway Oil Company's Olinda 96, Olinda, California	8,046
1928	Texon Oil and Land Company's University 1-B, Big Lake, West Texas	8,523
1929	Shell Oil Company's Nesa 1, Long Beach, California	9,280
1930	Standard Oil Company of California's Mascot 1, Midway, California	9,753
1931	Chansler-Canfield-Midway Oil Company's Hobson A-2, Rincon field, Ventura County, California	10,030
1931	Penn-Mex Fuel Company's Jardin 35, State of Vera Cruz, Mexico	10,585
1933	North Kettleman Oil & Gas Company's (later taken over by Union Oil Company) Lillis-Welch 1, Kettleman Hills, Kern County, California	10,944
1934	General Petroleum Corporation's Berry 1, Belridge, Kern County, California	11,377
1935	Gulf Oil Corporation's McElroy 103, Gulf-McElroy, Upton County, West Texas	12,786
1938	Continental Oil Company's KCL A-2, Wasco, Kern County, California	15,004
1944	Phillips Petroleum Company's Ada Price 1, Wildcat, Pecos County, West Texas	15,279
1944	Standard Oil Company of California's KCL 20-13, South Coles Levee, Kern County, California	16,246
1945	Phillips Petroleum Company's Schoeps 3, Wildcat, Brazos County, Gulf Coast, Texas	16,655
1946	Pacific Western Oil Corporation's National Royalties 1, Miramonte area, Kern County, California	16,668
1947	Superior Oil Company of California's Weller 51-11, Wildcat, Caddo County, Oklahoma	17,823
1949	Superior Oil Company of California's Limoneria 1, Wildcat, Ventura County, California	18,734
1949	Superior Oil Company of California's Unit 1, Wildcat, Sublette County, Wyoming	20,521

hard at work on a deep test in Stone County, Mississippi, at the end of the year, and where he intends to stop had not been made known.

That well, of course, had already set a new record for Mississippi and is now the second deepest in the world. As this was written, George Vasen et al's Tung Oil Corporation of America 1 was drilling at 19,875 feet, 646 feet short of the Wyoming champion's bottom. Then an average of 55 feet in three days was being made, and at that rate a new record would probably be set by the time this issue reaches the reader.

Remarkable thing about this deep well is that the drilling is being done with a fairly old rig, whose manufacturer certainly made no claims for its 20,000-foot capabilities.

Besides Mississippi, there were new individual drilling depth records set in seven other areas during 1950. The deepest of those was in South Louisiana, where Placid Oil Company drilled its City of New Orleans 1 in La-Fourche Parish to 16,237 feet to better the previous record of 16,106 set in 1948.

Other states that were sites of deeper wells in 1950 and their new records were: New Mexico, 14,865 feet; Colorado, 14,238; North Dakota, 12,526; Idaho, 12,512; Nevada, 10,314 feet; and Arizona 6863.

It took the industry 72 years after its birth to drill its first 10,000-foot well, and it was then done in California. In the meantime a well has been drilled to over twice that depth and hundreds have been drilled below 10,000 feet.

By the end of 1950 there were 21 states where 10,000-foot wells had been drilled. Two of those joined the group during the year. They were Idaho with a 12,512-foot well and Nevada where a test was taken to 10,314 feet.

The world's four deepest wells were drilled in the U. S. Three of those were drilled by Superior and the other is George Vasen's Mississippi deepster. All four of them were drilled to below 17,000 feet and are the only tests ever to reach the 17,000-foot level.

All but one of the states that had its depth record lowered during 1950 were in the 10,000-foot bracket. That exception was Arizona, where a well in Cochise County was drilled and abandoned at 6863 feet.

The world's deepest cable tool well is still Manufacturers Light & Heat Company's Barton Estate 8, Fayette County, Pennsylvania, drilled in 1949. That well, with bottom at 10,312 feet. is also the state's depth record holder.

Drilling Depth Records in U. S. by States and Districts

State or District	Feet	Year	Formation	Well, Location and Remarks
Wyoming	20,521	1949	U. Cretaceous	Superior Oil Co. of California's Unit 1, Pacific Creek area, Sublette County World's Deepest.
Mississippi	19,627	1950	Smackover	George Vasen et al's Tung Oil Co. of America 1, C SW NE 9-2s-11w, Stone County. Still Drilling.
California	18,734	1949	U. Miocene	Superior Oil Co. of California's Limoneria 1, N. Montalvo area, Ventura County.
Oklahoma	17,823	1947	Pennsylvanian	Superior Oil Co. of California's Weller 51-11, Sect. 11-8n-12w, Caddo County.
Upper Texas Coast	16,655	1945	L. Cretaceous	Phillips Petroleum Company's Schoeps 3, Millican salt dome area, Brazos County.
East Texas	16,347	1949	Smackover	Humble Oil & Refining Company's R. P. McWatters 1, Freestone County.
South Louisiana	16,237	1950	Miocene	Placid Oil Company's City of New Orleans 1, C NW SE 22-23s-22e. LaFourche Parish.
Lower Texas Coast	16,006	1947	Frio	The Texas Company's Yturria L & L Co. 6, Raymondville area, Willacy County.
Alabama	15,668	1949	Jurassic	Humble Oil & Refining Company's Williams 2, Sect. 21-6n-4w, Washington County.
Florida	15,455	1947	L. Cretaceous	Gulf Refining Company's State of Florida 1, Big Pine Key area, Monroe County.
South Central Texas	15,301	1945	L. Cretaceous	Quintana Petroleum Company's South Texas Syndicate 3-D, McMullen County.
West Texas	15,279	1944	Ellenburger	Phillips Petroleum Company's Ada Price 1, T. C. Railway Survey, Pecos County.
North Louisiana	14,967	1947	Salt	Cotton Valley Operators Committee's A. G. Oliphant—S. Banks 2, Cotton Valley field, Webster Parish.
New Mexico—S.E.	14,865	1950	Ellenburger	Humble Oil & Refining Company's Federal-Wiggs 1, Sect. 31-24s-27e, Eddy County.
Texas Panhandle	14,278	1949	Arbuckle	Gulf Oil Corporation's E. Porter "A" 1-E, Sect. 413 Blk. 43, H&TC Survey, Lipscomb County.
Colorado	14,238	1950	Dakota	Mountain Fuel Supply Company's Unit 1, Sect. 14-12n-100w Hiawatha field, Moffat County. Still Drilling.
Southwest Texas	14,033	1948	Frio	The Texas Company's C.C.W.C.&I.D. 5-1, Potrero del Espiritu Santo Gr, Cameron County.
Utah	13,766	1949	Pennsylvanian	Pacific Western Oil Corporation & Equity Oil Company's Unit 1, Sect. 33-21s-21e, Grand County.
North Texas	13,352	1947	Simpson	Denver Producing & Refining Company's Rich 1, Grayson County.
North Dakota	12,526	1950	Granite	Plymouth Oil Company et al's Leutz 1, C NW NE 28-142n-89w, Medicine Butte area, Mercer County.
Idaho	12,512	1950	Pennsylvanian	Phillips Petroleum Company & Utah Southern Oil Company's Unit 1, Oneida County. Still Drilling.
Montana	11,519	1949	Cambrian	Shell Oil Company's Crow Tribal 7904-1, Sect. 36-9s-37e, Big Horn County.
Arkansas	11,440	1948	Smackover	Stanolind Oil & Gas Company's Union Saw Mill 1, Sect. 18-19s-24w, Lafayette County.
Michigan	11,012	1948	Cambro-Ord.	Ohio Oil Company-Pure Oil Company's Reinhardt 1, West Branch field, Ogemaw County.
Washington	11,002	1947	.....	Standard Oil Company of California's Alderwood Comm. 1, Snohomish County.
Nevada	10,314	1950	.....	Continental Oil Company & Standard of California's Unit 1, SW NE SE 31-16n-56e, White Pine County.
Pennsylvania	10,312	1949	U. Silurian	Manufacturers Light & Heat Co.'s Berton Est. 8, Fayette County. World's Deepest Cable Tool Well.
North Carolina	10,054	1946	Granite	Standard Oil Company of New Jersey's Cape Hatteras 1, Dare County.
West Virginia	10,018	1941	Queenston	Hope Natural Gas Company's C. S. Gribble 2-8517, Grant District, Harrison County.
Virginia	9,936	1949	Ordovician	The California Company's Kipps Anthracite Coal Co. 1, Montgomery County.
New Mexico N. W.	9,466	1945	Quartzite	Southern Union Gas Company's Barker-Ute Indian 9, Barker Creek field, San Juan County.
Oregon	9,263	1946	.....	The Texas Company's Cooper Mountain 1, Washington County.
New York	8,626	1944	Ordovician	New Penn Development Company's Herrington 1, Woodhull field, Steuben County.
Kansas	8,243	1947	Arbuckle	Stanolind Oil & Gas Company's Feathers 1, Sect. 15-35s-33w, Seward County.
Maryland	8,165	1941	Helderburg	William Snee's Schartzer 1, Accident District, Garrett County.
South Dakota	8,000	1943	Ordovician	Northern Ordnance Co. & Carter Oil's Harding 1, Camp Crook Anticline, Harding County.
North Central Texas	7,980	1945	Ellenburger	Humble Oil & Refining Company's C. H. Tompkins 1, T&P Railway Survey 169, Parker County.
Ohio	7,889	1933	Clinton	Benedum and Trees Knowlton 1, Independence Township, Washington County.
Georgia	7,490	1944	Cretaceous	Stanolind Oil & Gas Company's J. H. Pullen 1, Mitchell County.
Illinois	7,207	1940	St. Peter	Pure Oil Company's Billington 3, Sect. 26-1n-7e, Cisne field, Wayne County.
Arizona	6,863	1950	.....	A. S. Waddell's Unit 1, Sect. 23-13s-24e, Cochise County.
Nebraska	6,846	1938	Pennsylvanian	Union Oil Company of California's Agate 15-1, Sioux County.
Kentucky	6,686	1949	Knox	Pure-Ashland-I. B. Browning's M. L. Walker 1, Sect. 22-N-24, Webster County.
Indiana	6,408	1946	Trenton	Continental Oil Company's Cooper 1-D, Griffin field, Gibson County.
Tennessee	5,750	1947	Granite	The California Company's E. W. Beeler 1, Sect. 4-15s-29e, Giles County.
Iowa	5,305	1930	Cambrian	Oil Development Company's Wilson 1, Page County.
New Jersey	5,022	1928	Basement	W & K Oil Company's Well 1, Jackson Mills area, Ocean County.
Missouri	4,740	1941	Cambrian	Strake Petroleum Company's T. P. Russell 1, Pemiscot County.

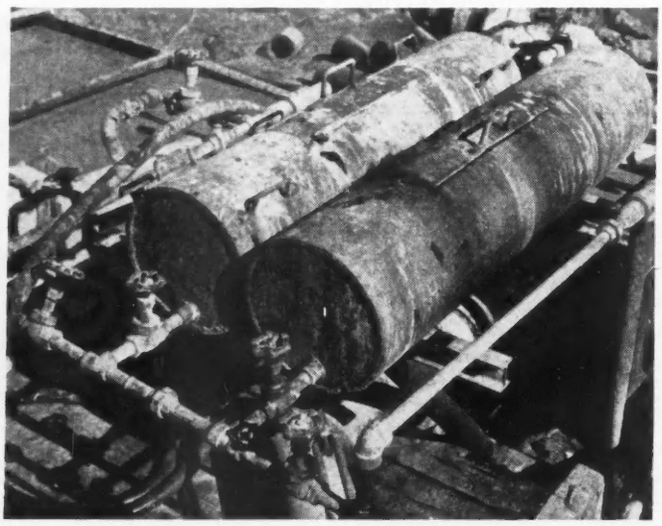
How to do it!

DRILLING HINTS

$10 is paid for each illustrated acceptable contribution. Mail to The Editor, WORLD OIL, P. O. Box 2608, Houston 1, Texas.

HOW TO—Dispense Drilling Mud Treating Chemicals

This unusual method of dispensing chemicals for the treatment of drilling muds has proved practical in eliminating waste of chemicals and making their addition to the mud a simple matter. In many areas where rotary drilling predominates, treatment of the drilling fluid is required. Handling chemicals used in such treatment around the rig is, by the very nature of drilling operations, a difficult one. Illustrated is a practical and efficient means for dispensing caustic soda and quebracho in the treatment of so-called "red" muds in the Gulf Coast.



The device shown was added to the shale shaker skid as an integral part of that unit. Three-inch I-beams are welded as extension braces to form the platform supporting the two containers. By extending the vessels behind the shale shaker, it is easy to enlarge the platform to facilitate adding dry chemicals to each container.

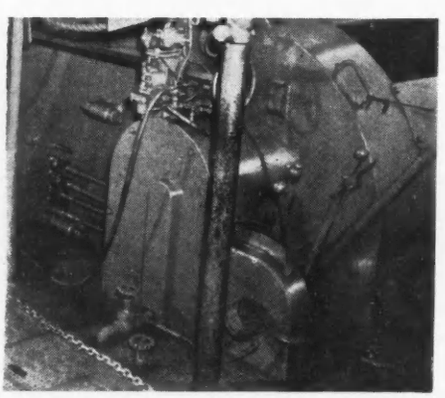
Each vessel is made of a ten-foot section of 18-inch casing, welded closed at each end. A rectangular slot cut in the top of each section forms a cover and provides access to the container. Two pairs of hinges are welded to the cover and locked with a small rod extending through both hinges. A handle added to the opposite side permits quick lifting. The opposite end of each section was tapped and a short nipple and a globe valve attached so that the flow of chemicals can be controlled.

To the near end of each container are welded couplings to provide for the addition of either water or steam to the contents. The header on the left side of the vessel is for water, while the line on the right is a steam connection from the steam turbine used to drive the shaker. Four valves in this manifold make it possible to add either steam or mixing water to either vessel. After the dry chemicals are poured through the openings, the cover is closed and the water jet serves to thoroughly mix them. It was found that steam would heat the chemicals and thereby provide more complete action on the mud.

HOW TO—Indicate Water Flow Through Brake Drums

To minimize wear on the drawworks brakes equipped with water cooling, it is essential to maintain a constant flow of water through the brake drums. Because the driller is charged with the responsibility of so many operations on the derrick floor, it is essential that all possible visual aid be given him to carry out his work. Here is a simple idea that makes it easy for the driller to determine whether or not water is flowing through the brake drums of the drawworks.

The feed line to the brake cooling system is connected into the water supply of the rig, and a valve in this feed line makes it possible to adjust the flow of water through the drums. Immediately downstream of the inlet valve, a tee is added with a reduced side outlet to accommodate three-quarter-inch pipe. This pipe was further reduced in size to a one-quarter-inch tube connected to a pressure gauge.



The gauge faces upward and is fitted with a protective metal screen guard to prevent breakage of the glass covering. It is near the clutch pedals at the floor, so that every time the driller looks down at the pedals, he can also glance at the pressure gauge. The gauge is behind the headache post and next to the drawworks body, placing it well out of the way and providing ample protection for it.

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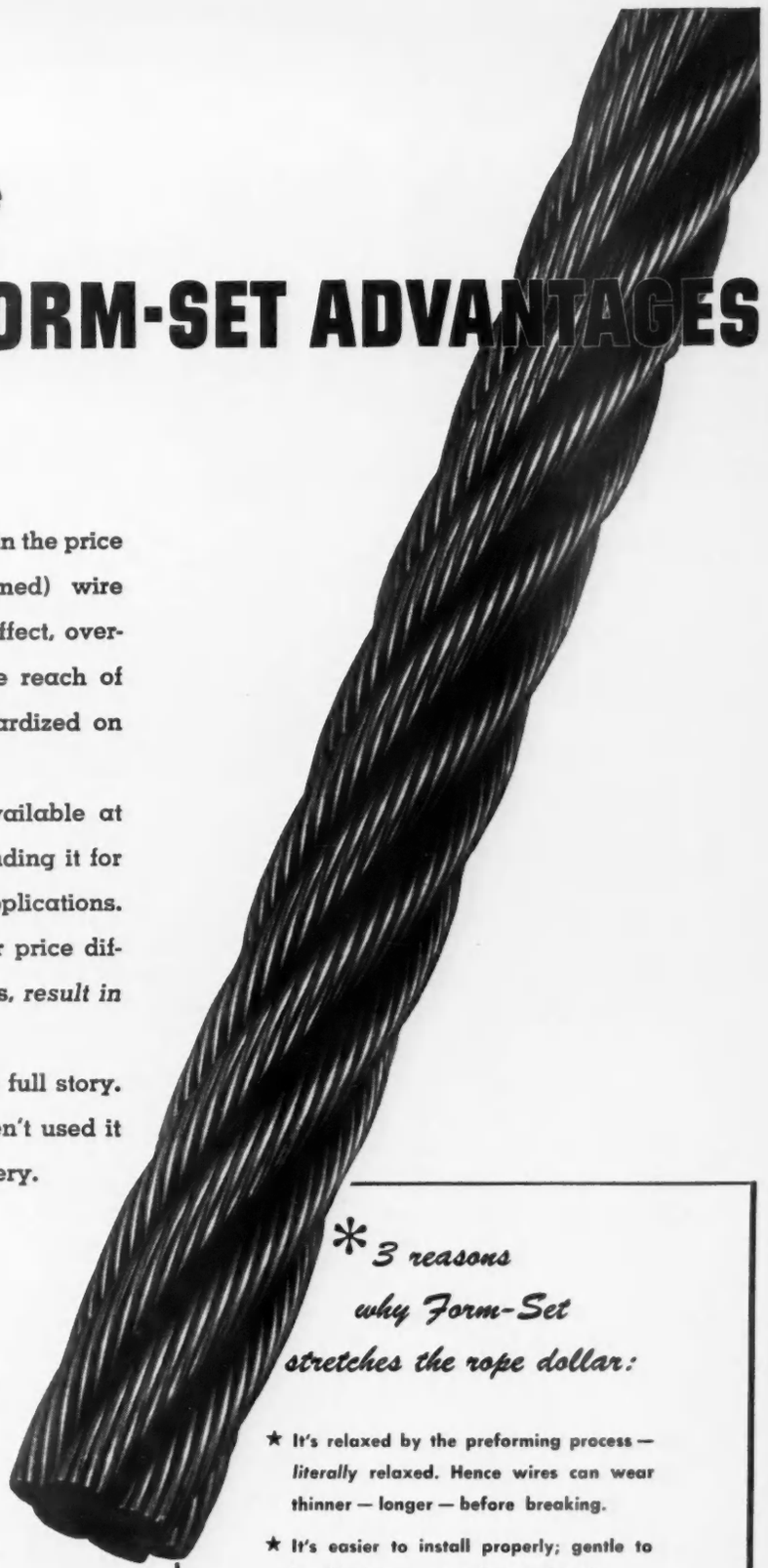

Bethlehem Form-Set wire rope after cutting. Note that preforming eliminates the need for seizing.

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DRILLING HINTS

HOW TO—

Mount Exhaust Stack For Doghouse Heater

Winter weather in many areas where drilling is in progress makes it necessary to provide some form of heat in the change room where the crew changes clothes. Many types of heaters may be found on the drilling rig, and range from steam to electrical heaters. In the case of the power rig, the heating problem is more acute, and in some instances, gas-fired heaters are used when it is safe to do so.

Here is a simplified method of increasing the heating value of the change room stove by extending an exhaust stack high enough above the roof of the change room to provide an effective draft. A broken tee pipe fitting is placed over the upper outlet to prevent rain from entering the chimney pipe.

The chimney is made of three-inch pipe and broken near the roof of the change room. The line is equipped with a worn hammer union so the pipe can easily be made up or taken down for rig moves. To simplify handling the disassembled pipe, a support retains the chimney in horizontal position for moving. A semi-circular hinge fabricated from salvaged parts is attached to the chimney so that it spans the union connection at the bottom. One side of the hinge is welded to the lower section of the pipe while the other end of the hinge is welded to the removable part. A short vertical riser is tack-welded to the top and at about the middle of the roof. The top of this riser is fitted with a pipe saddle on which the chimney rests during transit. It is easy to break down the stack by knocking loose the union and swinging the chimney into a horizontal position. It can then be lashed in place by soft line or wire.

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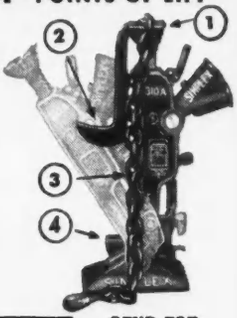

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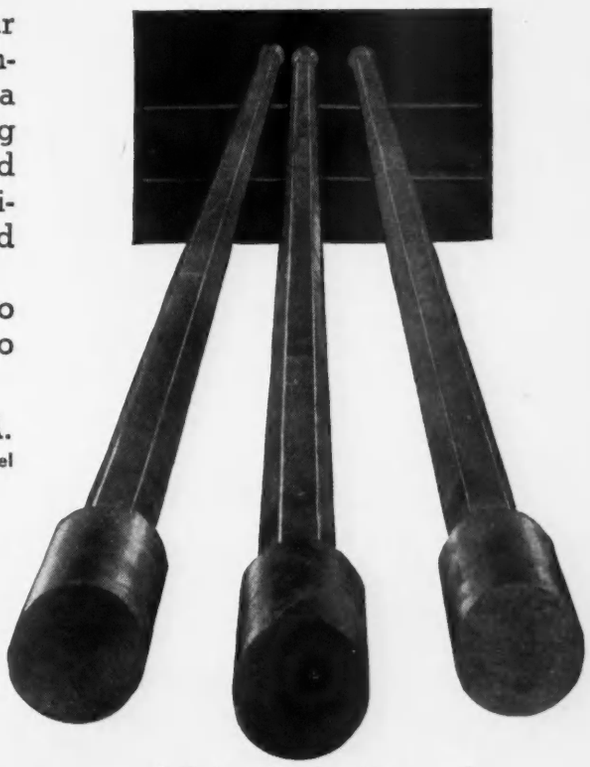

Kelly-bar blanks—hexagonal section, rough-machined all over.

Drill-collar blanks—rough-turned, rough-bored.

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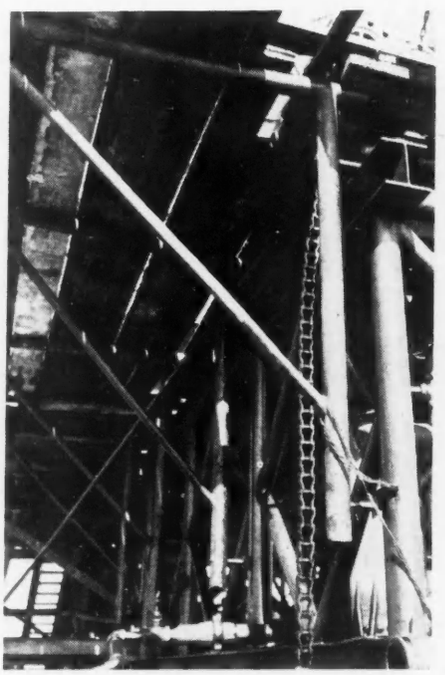
HOW TO—Make Simple Braces for Engine Walkaround

Because the weight of the drawworks, transmissions and engines is supported by heavily-constructed substructures made to the dimensions of the equipment supported, it is often necessary to erect an extended platform surrounding the engine and transmission. The platform is used by the crew for working around the engines and for storage of materials and tools used frequently on the floor. Because of its width, a walkaround must be dismantled during shipment, since the substructure



parts themselves, and particularly the engine substructure, are made to conform to highway dimension and weight specifications. Considerable time in setting up and tearing down these walkarounds, as well as the initial equipment investment, may be saved by this simple, yet substantial support for the walkaround.

The idea is to make hangers out of the angle braces which support the timber for the walk way. Each of the braces illustrated are integral units which are hung from the tubular uprights in the substructure. Solid steel rods about one-inch in diameter are welded completely through the vertical pipe on the hanger at a point about one foot from the top. These rods are welded at right angles to the pipe and extend approximately eight inches from it. A right angle hook at the end of the rod fits into a matching hole drilled in the web of the I-beam runner on the top edge of the substructure.

The lower end of the hanger is held off the vertical casing by a spacing bar which is also of rod steel and welded through both walls of the pipe. A spacing flange is welded to the rod at a predetermined distance from the vertical pipe so that when hung in place, the pipe is parallel to the large substructure supporting upright. When these hangers are in place, they form a hinge, to a limited degree, and are made stationary by bolting one or two lengths of timber planking which they support. Relatively little time is required to dismantle this type of support.

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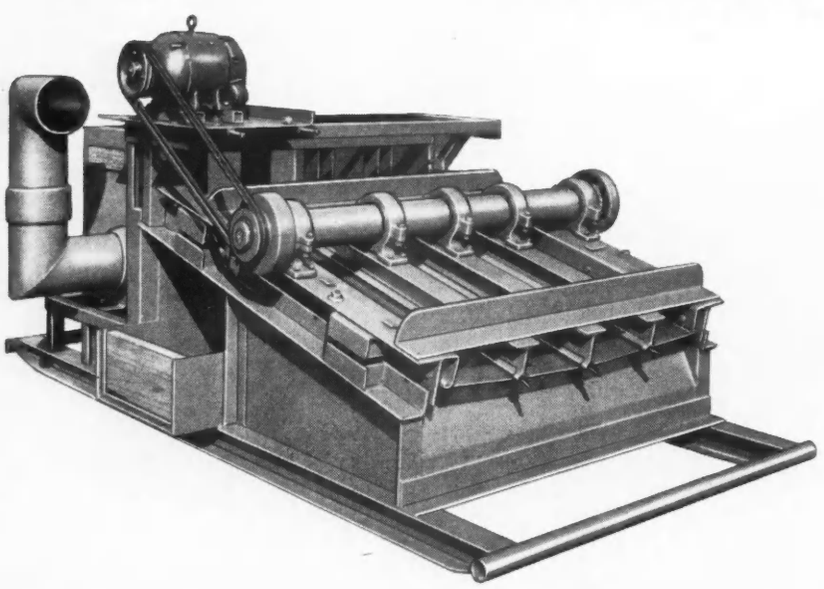

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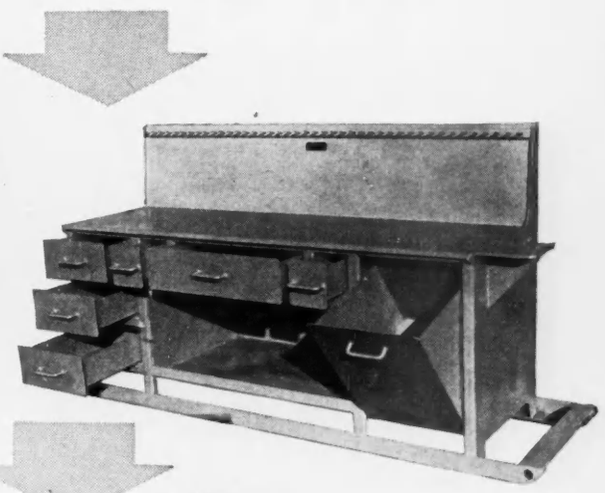

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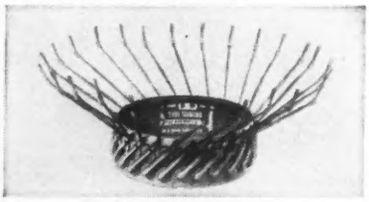

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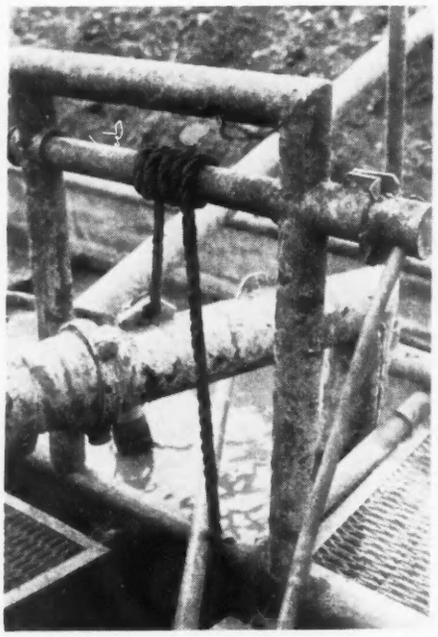
DRILLING HINTS

HOW TO—Support Mud Suction Line

A device which simplifies the work of adjusting the height of the mud suction line, one which is made up largely of salvaged pipe materials, is being used with good results by a drilling contractor operating in the West Texas area.



The all-welded rack illustrated is set up on the side of the mud mixing tank and is designed on the order of a windlass. With it the operator is afforded considerable leverage in lifting the heavy suction pipe and at the same time is able to make close adjustments in the level at which suction is desired.

The rectangular structure is made of 4½-inch O.D. pipe. The winding "drum" which spans the opening is a length of 3½-inch O.D. pipe and the rope is wound up by the operation of a three-foot round bar which is run through holes in the end of that pipe. The pawl device visible at the near end of the drum is a five-inch piece of ½-inch flat bar pivoted at the far end and positioned so that it can be raised and dropped into any one of the eight notches provided. The device is comparatively simple in design and is readily adaptable to the particular equipment and conditions existing on any drilling rig.

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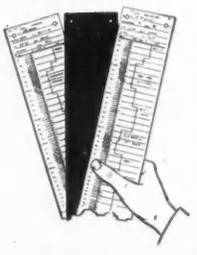

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24,944 Oil Wells to Get

By ELTON STERRETT
Engineering Editor

DURING 1951, an estimated 24,994 oil wells will be equipped with some type of artificial lifting unit. This figure includes the down-the-well pumps actuated by sucker rods, hydraulic-type pumps, air-gas lifts and all other types of electrical or mechanical lifting equipment applied at each well. This figure represents a minimum, to which would be added the purchase of new pumping equipment needed on shutin wells which are restored to production.

Compared to the 21,940 artificial lifting units installed last year, the figure anticipated for 1951 represents an increase of 13.9 percent and is definite indication that the backlog of pumping equipment which some companies have had over several years has been dissipated and that equipment is being installed as wells are completed and the need for each unit is evident.

Determination of the probable number of artificial lifting units for each state or area is dependent on a number of factors, including the number of oil wells anticipated to be completed from that area's forecasted drilling for 1951; probable rate of swing of wells in the flowing column during 1950 to pumping status during 1951; effect of water-flood operations on wells in areas where added reservoir stimulus allows wells to be changed from pumping to flowing operation;

Estimate of 1951 Artificial Lifting Equipment Needs

(Includes requirements for all types of pumping units and also air/gas lift units)

STATE or DISTRICT	Estimated Number Wells To Go on Pump or Air/Gas Lift During 1951	Wells Put On Pump or Lift in 1950	Oil Wells Completed In 1950	Number of Flowing Wells End Of 1950	Number of Net Wells Abandoned or Shut-in During 1950	Estimated Average Number Pumping Wells To Be Maintained During 1951	Estimated Maintenance Cost (Equipment Only) For All Pumping Wells in 1951
Alabama	26	19	18	0	0	71	$ 6,000
Arkansas	265	176	246	361	56	3,373	337,000
California	2,188	1,514	1,284	2,143	†2,322	26,853	10,070,000
Colorado	59	20	20	191	6	581	73,000
Illinois	1,200	1,355	1,300	16	†589	33,713	2,950,000
Indiana	640	598	575	12	391	4,266	341,000
Kansas	1,998	1,951	1,962	73	891	31,092	3,109,000
Kentucky	523	501	506	5	136	15,521	1,358,000
Louisiana	1,316	1,150	1,307	3,477	172	8,290	950,000
North Louisiana	688	673	689	564	†172	6,506	683,000
South Louisiana	628	477	618	2,913	344	1,784	267,000
Michigan	465	586	340	141	276	3,809	419,000
Mississippi	288	290	94	280	8	1,312	210,000
Montana	176	168	149	20	†53	3,174	397,000
Nebraska	56	45	30	35	†50	127	18,000
New Mexico	264	182	400	3,232	94	2,699	675,000
New York	440	386	436	0	286	23,720	1,067,000
Ohio	390	358	348	50	668	21,625	1,081,000
Oklahoma	3,199	2,800	3,114	1,740	648	56,586	5,659,000
Pennsylvania	549	572	572	0	1,172	82,049	3,282,000
Texas	10,125	8,596	10,612	41,484	3,126	84,830	10,774,000
Dist. 1: South Central	290	418	225	283	83	3,571	446,000
Dist. 2: Middle Gulf	551	264	349	3,142	65	1,547	224,000
Dist. 3: Upper Gulf	1,096	840	922	4,986	344	5,270	659,000
Dist. 4: Lower Gulf-S.W.	670	590	930	4,545	337	6,093	853,000
Dist. 5: East Central	76	64	82	409	†59	1,558	241,000
Dist. 6: Northeast	828	678	530	13,296	†291	12,110	2,301,000
Dist. 7-B: North Central	882	813	993	1,408	1,109	7,121	1,139,000
Dist. 7-C: West Central	584	367	559	628	173	2,024	314,000
Dist. 8: West	2,632	2,226	3,602	11,629	590	16,297	1,263,000
Dist. 9: North	1,774	1,655	1,733	1,132	777	21,416	2,356,000
Dist. 10: Panhandle	742	681	687	26	435	7,823	978,000
Utah	43	30	4	3	†1	57	6,000
West Virginia	160	132	132	0	232	15,880	913,000
Wyoming	615	501	360	323	66	5,195	649,000
Other States[1]	9	10	3	1	9	151	16,000
Total United States	24,994	21,940	23,812	53,587	5,222	424,974	$44,360,000

[1] Other States include: Florida, Missouri, Tennessee and Virginia.
States marked (†) showed more shut-in wells again put on production than total abandonments. Figure shown represents surplus of formerly inactive wells put on production over actual number of abandonments.

swing of drilling and production to or away from the areas where heavy, low-gravity, high sulfur oils predominate; effect of new completion methods such as Hydrafrac, which allows wells in certain formations to produce without artificial aid where previously they had required pumping; and the return of pipe line facilities, swamped with flowing production during 1950, to the transportation of oil from artificially lifted areas.

Company data on pumping requirements, which relate to surface units only and do not cover anticipated air-gas lift units, show an increase over 1950 purchases of more than 13 percent. Correlation between the company increase and that indicated by the factors which formed the basis for the accompanying table of artificial lift requirements is evident when it is considered that the companies reporting do not list air-gas lift, but do incorporate insofar as possible their anticipated purchase of equipment units to replace those which were "borrowed" earlier from wells which are expected to be brought back into production during 1951 if conditions warrant.

Active Areas

Texas, Oklahoma and California indicate that there will be artificial lift requirements for 1951 which will outstrip the anticipated increase of all oil wells during the year. In Texas this is due primarily to a considerable program of pump installation in District 6 (Northeast) and to the swing of production from flowing to pumping status on many of the wells in the former category during 1950 in Districts 3 (Upper Gulf) and 8 (West Texas).

Oklahoma, despite active waterflooding operations, is expected to require more pumps than the anticipated total oil well completions in the state, as is California. In this latter state the change in demand requirements for crude brought back into operation large numbers of wells producing low-gravity, high sulfur oils which had been shut down due to lack of market. The Korean situation has reversed this, and such oils are now being produced as fast as the inactivated wells can be reequipped and again placed on production.

Wyoming, another state in which wells were taken off production due to lack of market demand, will see many of these wells outfitted with artificial lift and will find them again active. Many of these wells will require new equipment throughout, even though once on production.

Those states whose wells are predominantly or totally on a pumping status are among those listing reduced drilling activity during 1951, and in consequence show for a decrease in the number of pumping units anticipated for 1951 as against actual installations during 1950. On the other hand, those states or areas with large back-logs of flowing wells in 1950 appear among those indicating augmented artificial lift programs for 1951. In the first instance Michigan is an example, with a drop in units from 586 installed last year to a probable 465 during 1951. On the other side is District 6 of Texas, where 828 wells are expected to go on artificial lift during 1951, as against only 678 in 1950.

Shutins and Abandonments

The column of the table showing wells shut in or abandoned during 1950 indicates that California and Illinois, with a surplus of 2322 and 589, respectively, may be expected to continue to bring back off-production wells, and thus to augment the indicated figure of units estimated to be required in each state during 1951.

Over the nation, the gain in pumping wells through reactivation amounted to 3537 wells in those areas which showed negative abandonments, or surplus of old wells again put into service over the actual abandonment figures. Since each of these wells so listed cancels from the table one well actually abandoned, total net abandonment figure for the U. S. during 1950 was the tabular figure of 5222 plus the offset total of 3537, or 8759. This total compares with a compensated total of 14,449 wells tabulated during 1949, and indicates the extent to which the less desirable wells were called back into service during 1950. The decrease amounts to 5690 wells, or 39 percent of 1949 figures. Comparison of the figures in California show that there were net abandonments of 3858 in 1949 and a surplus over abandonments of 2322 in 1950, a gross swing of 6180 wells, or 23 percent of all the wells in the state which are produced through artificial lift.

Illinois, second in number of wells to gain over abandonment totals, shows a swing of 1051 over the two-year period, for a percentage of only 3 percent of all the wells expected to be maintained for pumping during 1951.

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Maintenance Costs

The production branch of the oil industry is expected to spend $44,360,000 for maintenance of the 429,974 wells on artificial lift in the U. S. during 1951. This is an increase of 8.9 percent over the comparable figure for 1950, and reflects the increased cost of equipment and the effect of a higher percentage of "old wells" to be maintained than ever before. This condition is attributable to the selective completion of flowing wells in many areas, and the extended life of wells in many other areas, due to improved production practices and aids to production such as water flooding and other methods of secondary recovery.

In some areas there are relatively large numbers of artificial lift units installed late in 1949 or during 1950, and they may be expected to require little if any maintenance in the absence of down-the-hole troubles; but to offset these are the completion of a greater percentage of wells in areas where corrosion and paraffin formation are serious. These two sets of conditions often exist in the same area, and thus may be expected to offset closely enough to maintain the probable accuracy of the tabulation.

Expenditures for maintenance in Texas are budgeted at $10,774,000 to cover 84,830 wells on artificial lift. California, with a budget of $10,070,000 for 26,853 wells, ranks second; and Oklahoma third, showing for $5,659,000 to maintain 56,586 wells. Other states earmarking more than $1 million for upkeep are Pennsylvania, Kansas, Illinois, Kentucky, Ohio and New York, in that order. Each of four RR Districts in Texas also shows for over the $1 million mark (North Texas (Dist. 9) requires $2,356,000; Northeast (Dist. 6), $2,301,000; West (Dist. 8), $1,263,000; and North Central (Dist. 7-B), $1,139,000).

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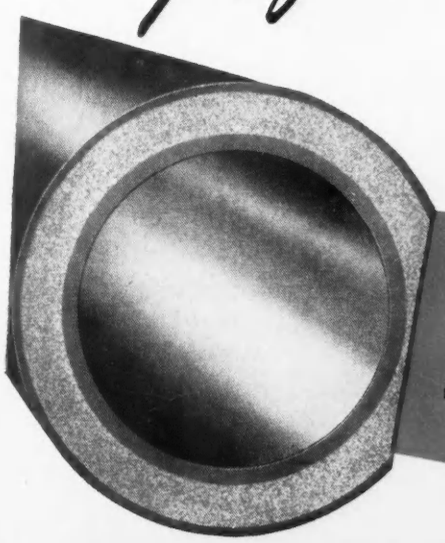

View of the IMPROVED INSERT pump barrel, showing how super-hard wearing surfaces for long life are combined with ductile core for high tensile strength.

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New High in U.S. Crude Production Likely for 1951

A NEW high in U. S. crude production is in prospect for 1951. It is expected that production will total 2,092,000,000 barrels during 1951, which would be an increase of 119,188,000 over the 1950 figure of 1,972,812,000 barrels. This would mean a daily average production of 5,731,500 barrels compared with 5,405,000 barrels in 1950, and with the 1948 peak of 5,519,000 barrels.

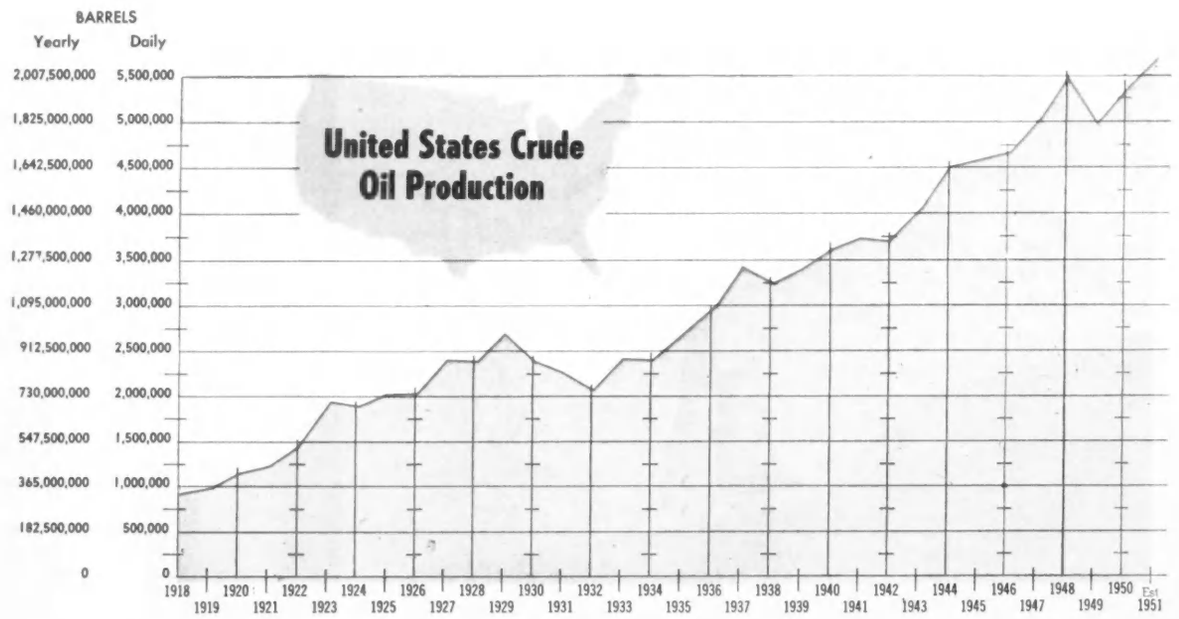
Production in 1950 exceeded that of the previous year by 132,505,000 barrels, a gain of 7.2 percent.

Factors which at the outset of 1950 held production in check are largely absent at this time. Crude stocks at the beginning of 1951 were 7 million barrels less than the year previous, and in consequence of increased demand, prices are firm in contrast with some evidence of weakness in the early part of 1950.

Production rates during the early months of 1950 were below that of the corresponding months of 1949, but rose rapidly during the last part of the year. Daily average production for each from July to the end of the year was sufficient to exceed the 1948 average. The last five months of 1950 showed an average of 5,815,000 barrels per day. If continued throughout 1951, this trend would mean a production of 2,122,000,000 barrels for the year.

Principal Producing Areas

Texas maintained its position ahead of the field with a total production during 1950 of 829,287,000 barrels or a daily average of 2,272,000 barrels. This was an increase of 11.5 percent over the production for 1949, but still



(All Figures in Barrels)

YEAR	Yearly Total	Daily Average	YEAR	Yearly Total	Daily Average	YEAR	Yearly Total	Daily Average
1918	355,928,000	975,000	1929	1,007,323,000	2,760,000	1940	1,353,214,000	3,707,000
1919	378,367,000	1,037,000	1930	898,011,000	2,460,000	1941	1,402,228,000	3,842,000
1920	442,929,000	1,213,000	1931	851,081,000	2,332,000	1942	1,386,645,000	3,799,000
1921	472,183,000	1,294,000	1932	785,159,000	2,151,000	1943	1,505,613,000	4,124,900
1922	557,531,000	1,528,000	1933	905,656,000	2,481,000	1944	1,677,904,000	4,584,400
1923	732,407,000	2,007,000	1934	908,065,000	2,488,000	1945	1,713,655,000	4,694,900
1924	713,940,000	1,956,000	1935	996,596,000	2,730,000	1946	1,733,939,000	4,750,500
1925	763,743,000	2,092,000	1936	1,099,687,000	3,013,000	1947	1,856,987,000	5,087,600
1926	770,874,000	2,112,000	1937	1,279,160,000	3,505,000	1948	2,016,282,000	5,509,000
1927	901,129,000	2,469,000	1938	1,214,355,000	3,327,000	1949	1,840,307,000	5,041,900
1928	901,474,000	2,469,000	1939	1,264,962,000	3,466,000	1950	1,972,812,000	5,405,000
						1951 Est.	2,092,000,000	5,731,500

Source: U. S. Bureau of Mines, except 1950, which has been calculated with aid of Bureau statistics for first 10 months and American Petroleum Institute weekly reports for last two months.

about 8.2 percent below the state's maximum output figure of 903,498,000 barrels, set during 1948's record year. The Texas output was 42 percent of the nation's total, falling 2.72 percent behind its record contribution of 1948.

California maintains its hold on second position among oil-producing states, with a total of 327,750,000 barrels for 1950, or 898,000 barrels per day. This production represents a decline of 5,089,000 barrels from the previous year's total, or a drop of 1.5 percent. The drop also maintains the trend established since the state reached its all-time high in 1948. The state produced 16.6 percent of the U. S. total, as against 16.8 percent in the record year.

In third place Louisiana showed a 573,300 barrels per day average or 209,247,000 barrels during the year, an increase of 9.7 percent over 1949. Louisiana, unlike the two states which precede it in the production column, also showed a gain over the big year 1948. Figures for 1950 were 15.3 percent above the production in Louisiana during 1948, emphasizing the effect of the greater volume of production from the deep wells in the southern part of the state. Louisiana produced 10.6 percent of the total crude of the nation in 1950.

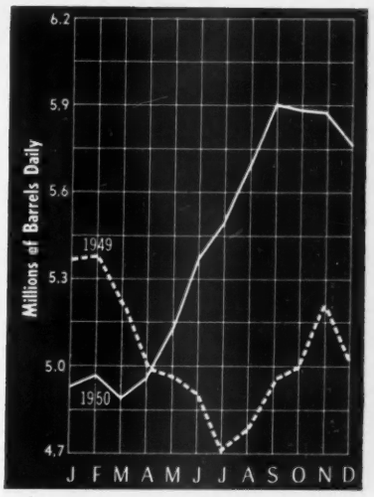
Oklahoma, in fourth place with 451,300 barrels per day average or 164,722,000 barrels of crude produced during 1950, accounted for 8.3 percent of the total. Production was up 8.5 percent over 1949, and 6.6 percent over the state's figure for 1948. Production for 1950 was the highest recorded in Oklahoma since 1938, and marks the comeback which production has made due to deeper drilling and more advanced secondary recovery practices.

Kansas Fifth

Fifth place is still held by Kansas, with a daily average of 295,500 barrels to give 107,851,000 barrels of production during 1950, which kept the state still in the select group producing over 100 million barrels per year. This total gave the state 5.5 percent of the national total. The 1950 figure was up 5.9 percent from 1948, but fell 2.8 percent behind the production recorded for 1948. Production in 1950 was second highest ever recorded for Kansas, and was the fifth time that the state has broken into the 100 million class.

Sixth among the oil-producing states is still Illinois, with a total of 62,447,000 barrels for 1950, or an average of 171,100 barrels per day. This figure is the lowest for the state since 1938, and marks a reduction of 3.3 percent from 1949 and 3.6 percent from the 1948 total. Illinois' position among the top six is seriously threatened by Wyoming, which in 1950 produced 60,058,000 barrels of crude at the rate of 164,500 barrels per day. This figure represents a 28 percent increase for the state over 1949, and a jump of 9.13 over the previous high for the state, established during the record-breaking year of 1948. Illinois accounted for 3.2 percent of national production, with Wyoming contributing 3.0 percent.

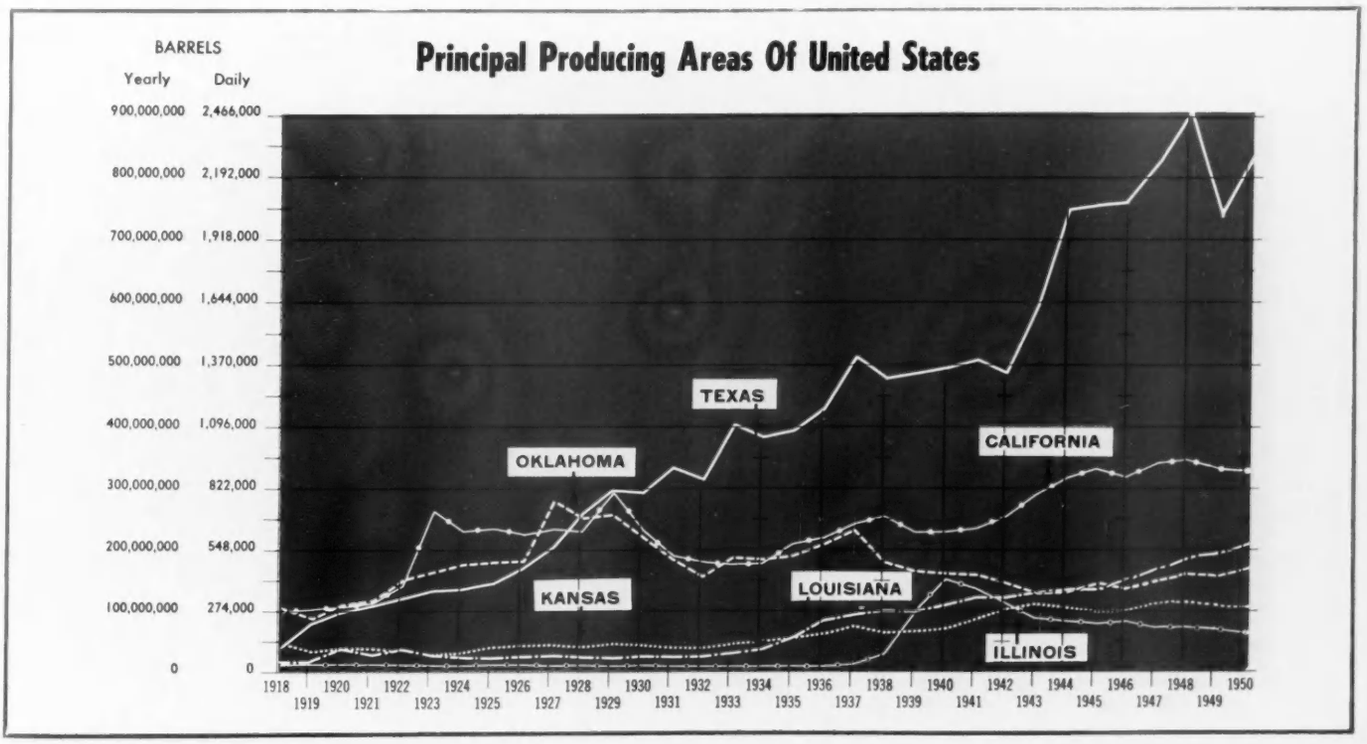
New York, Ohio, Pennsylvania and West Virginia combined to produce 22,180,000 barrels during 1950, an increase of 295,000 barrels over 1949, but a drop of 2.9 percent from 1948 totals, and 1.1 percent below the ten-year average for the area. The entire production of the four states



Daily Average Crude Oil Production, by Months
(Barrels per Day)

MONTH	1949	1950
January	5,389,000	4,922,200
February	5,375,600	4,966,900
March	5,224,300	4,877,800
April	5,011,800	4,968,400
May	4,972,400	5,143,300
June	4,903,300	5,377,700
July	4,703,800	5,484,400
August	4,780,400	5,664,300
September	4,940,200	5,887,900
October	5,029,300	5,899,900
November	5,209,500	5,882,600
December	5,024,300	5,757,800

Source: U. S. Bureau of Mines, except last two months of 1950 based on American Petroleum Institute weekly reports.



amounted to only 1.1 percent of the national total for the year, as against 1.2 percent in 1949 and the same amount during the record year of 1948.

On a percentage basis Montana, down 11.2 percent from 1949 with 8,139,000 barrels production for the year, showed the greatest drop. Other states showing a decline from 1949 daily production figures are Michigan, down 3.5 percent; Illinois, down 3.3 percent; Ohio, down 2.1 percent; Colorado, off 1.7 percent; West Virginia, off 1.3 percent; and New Mexico down 0.5 percent. Only two Texas Railroad Commission districts recorded a decline from 1949 daily production figures: East Central Texas (District 5) reporting off 2.7 percent and Panhandle (District 10), being down 0.3 percent from last year's figures.

Greatest gain in the percentage column showing change from 1949 to 1950 on daily production was transferred from Florida, last year's record holder, to Nebraska, up 333.3 percent (annual total shows 330,000 barrels for 1949 against 1,423,000 for last year), which brought the state's contribution to the national total from 0.2 percent to 0.07 percent. Other states showing high percentage gains in daily average production are Utah, which stepped its daily output from 1700 barrels to 3300, or a gain of 94.1 percent; Alabama, up from 1300 barrels to 2000 per day average, for a percent gain of 53.8; Wyoming, up 27.9 percent in daily output; Kentucky, up from 23,700 barrels per day average to 28,400 barrels to show a gain of 19.8 percent. Greatest percent gain in daily production among the Railroad Commission districts was West Central Texas (District 7-C), in which production jumped from 47,100 barrels per day average in 1949 to 63,800 barrels in 1950 to show a 35.5 percent increase. West Texas (District 8) showed a 26.0 percent increase in daily average figures, rising from 577,200 to 727,400 barrels. This one district contributed 13.45 percent of the total daily production in the U. S., and 31 percent of the entire production of the state of Texas.

(See tables on 144-146.)

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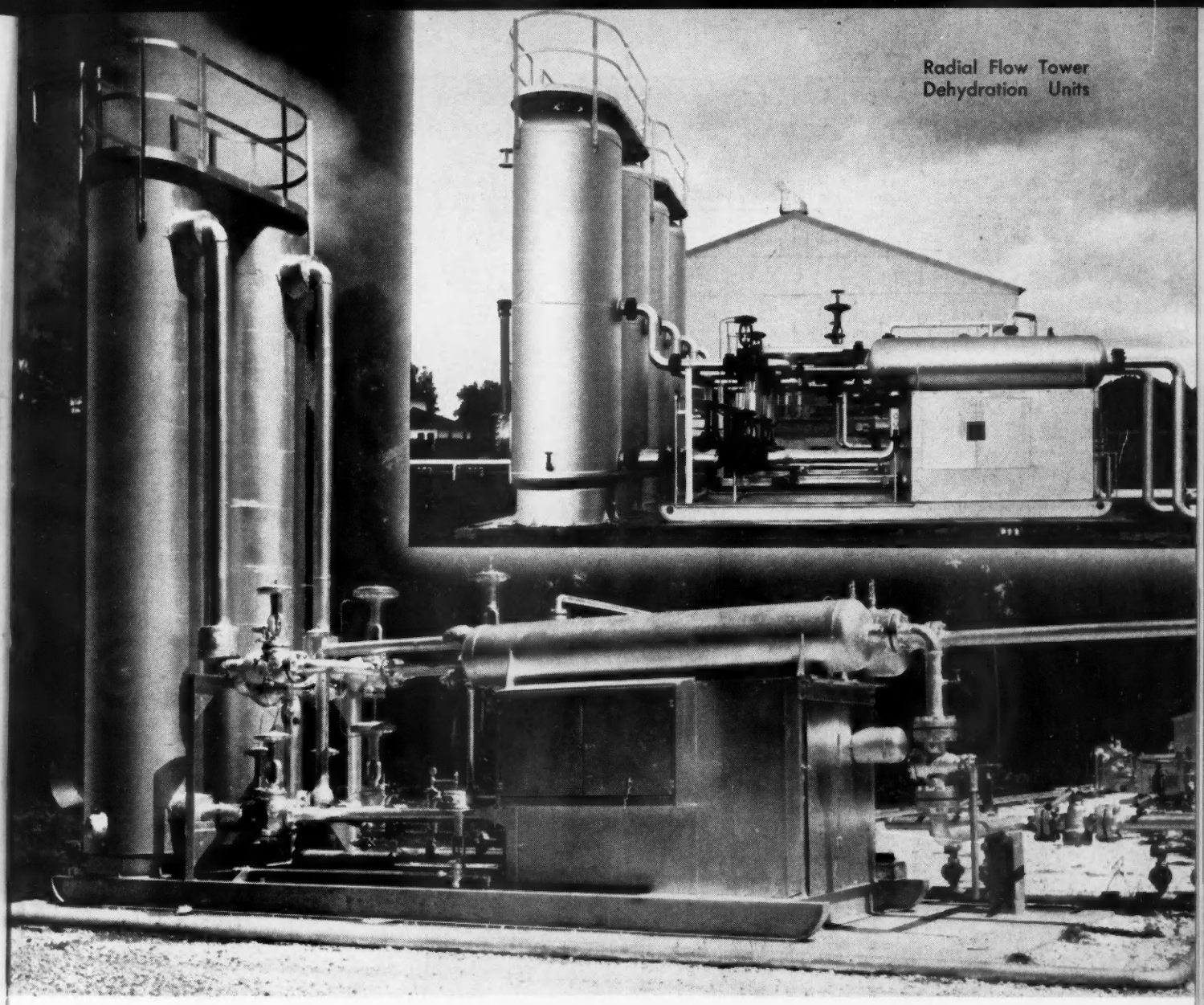
U. S. Crude Production, by States and Districts, December and Years, 1949 and 1950

From U. S. Bureau of Mines, except November and December, 1950, estimated from A.P.I. weekly reports, and breakdown of Louisiana and Texas by districts based on various sources.

(THOUSANDS OF BARRELS)

STATE or DISTRICT	PRODUCTION IN DECEMBER: Monthly Total in December 1949	Monthly Total in December 1950	% Diff. '49-'50	Daily Average for December 1949	Daily Average for December 1950	Year Total 1949	Year Total 1950	PRODUCTION DURING YEAR: Daily Average for Year 1949	Daily Average for Year 1950	% Diff. '49-'50	Year's Prod. in 1950 as Percent of U.S. Total	CUMULATIVE PRODUCTION To End of 1950: Thousands of Barrels	As Percent of U.S. Cumulative
Alabama	49	82	+ 67.3	1.6	2.7	462	728	1.3	2.0	+53.8	0.04	2,656	0.01
Arkansas	2,640	2,669	+ 1.1	85.1	86.1	29,936	31,293	82.0	85.7	+ 4.5	1.59	796,237	1.95
California	26,921	29,825	+ 10.8	868.4	962.1	332,839	327,750	911.9	898.0	— 1.6	16.61	8,619,638	21.07
Colorado	1,929	2,417	+ 25.3	62.2	78.0	23,910	23,499	65.5	64.4	— 1.7	1.19	147,529	0.36
Florida	29	47	+ 62.1	0.9	1.5	441	488	1.2	1.3	+ 8.3	0.03	1,581	0.00
Illinois	5,480	5,305	— 3.2	176.8	171.1	64,583	62,447	176.9	171.1	— 3.3	3.17	1,506,817	3.68
Indiana	894	946	+ 5.8	28.8	30.5	9,566	10,154	26.2	27.8	+ 6.1	0.51	200,038	0.49
Kansas	8,669	9,634	+ 11.1	279.6	310.8	101,868	107,851	279.1	295.5	+ 5.9	5.47	2,099,788	5.13
Kentucky	780	954	+ 22.3	25.2	30.8	8,656	10,348	23.7	28.4	+19.8	0.52	252,066	0.62
*Louisiana	17,071	19,106	+ 11.9	550.7	616.3	190,715	209,247	522.5	573.3	+ 9.7	10.61	2,561,187	6.26
North Louisiana	3,720	3,898	+ 4.8	430.7	125.7	44,393	44,558	121.6	122.1	+ 0.4	2.26	792,047	1.94
South Louisiana	13,351	15,208	+ 13.9	120.0	490 6	146,322	164,689	400.9	451.2	+12.5	8.35	1,442,176	3.52
Michigan	1,469	1,295	— 11.9	47.4	41.8	16,495	15,930	45 2	43.6	— 3.5	0.81	322,329	0.79
Mississippi	3,050	3,301	+ 8.2	98.4	106.5	37,966	38,330	104.0	105 0	+ 1.0	1.94	284,153	0.69
Missouri	3	3	.....	0.1	0.1	46	29	0.1	0.1	.....	0.00	572	0.00
Montana	704	748	+ 6.3	22.7	24.1	9,149	8,139	25.1	22.3	—11.2	0.41	168,312	0.41
Nebraska	50	181	+262.0	1.6	5.9	330	1,423	0.9	3.9	+33.3	0.07	7,260	0.02
New Mexico	4,053	4,010	— 1.1	130.7	129.4	47,932	47,675	131.3	130.6	— 0.5	2.42	682,990	1.67
New York	349	431	+ 23.5	11.3	13.9	4,248	4,322	11.6	11.9	+ 2.6	0.22	177,013	0.43
Ohio	278	245	— 11.9	9.0	7.9	3,433	3,350	9.4	9.2	— 2.1	0.17	620,916	1.52
Oklahoma	13,221	15,375	+ 16.3	426.5	496.0	151,902	164,722	416.2	451.3	+ 8.4	8.35	6,261,829	15.30
Pennsylvania	916	906	— 1.1	29.6	29.2	11,374	11,710	31.2	32.1	+ 2.9	0.59	1,125,014	2.75
Tennessee	4	2	— 95.0	0.1	0.1	22	21	0.1	0.1	.....	0.00	517	0.00
*Texas	62,613	75,116	+ 20.0	2,019.8	2,423.1	743,990	829,287	2,038.3	2,272.0	+11.5	42.04	13,721,428	33.54
Dist. 1: South Central	810	963	+ 18.9	26.1	31.1	9,693	10,456	26.6	28.6	— 7.5	0.53	287,474	0.70
Dist. 2: Middle Gulf	3,704	4,480	+ 21.0	119.5	144.5	47,559	49,019	130.3	134.3	+ 3.1	2.48	554,899	1.36
Dist. 3: Upper Gulf	12,000	13,848	+ 15.4	387.1	446.7	145,208	151,780	397.8	415.8	+ 4.5	7.69	2,620,227	6.40
Dist. 4: L. Gulf-SW	5,876	6,886	+ 17.2	189.5	222.1	71,987	76,819	197.2	210.5	+ 6.7	3.89	925,215	2.26
Dist. 5: East Central	1,062	1,256	+ 18.3	34.3	40.5	13,562	13,202	37.2	36.2	— 2.7	0.67	510,450	1.25
Dist. 6: Northeast	10,113	11,384	+ 12.6	32.6	367.2	127,680	131,791	349.8	361.1	+ 3.5	6.68	2,446,400	5.98
Dist. 7-B: N. Central	1,908	2,254	+ 18.1	61.5	72.7	22,152	25,273	60.7	69.2	+14 0	1.28	486,083	1.19
Dist. 7-C: W. Central	1,591	2,489	+ 56.4	51.3	80.3	17,175	23,273	47.1	63 8	+35.5	1.18	254,149	0.62
Dist. 8: West	18,171	24,138	+ 32.8	586.2	778.6	210,669	265,304	577.2	727.4	+26.0	13.45	2,411,563	5.89
Dist. 9: North	4,362	4,628	+ 6.1	140.7	149.3	49,392	52,767	135.3	144.6	+ 6.9	2.67	1,104,191	2.70
Dist. 10: Panhandle	2,864	2,790	— 2.6	92.4	90.0	33,255	33,153	91.1	90.8	— 0.3	1 68	670,173	1.64
Utah	100	109	+ 9.0	3.2	3.5	637	1,192	1.7	3.3	+94.1	0.06	1,840	0.00
Virginia	3	2	— 33.3	0.1	0.1	43	21	0.1	0.1	.....	0.00	191	0.00
West Virginia	242	218	— 9.9	7.8	7.0	2,839	2,798	7.8	7.7	— 1.3	0.14	440,950	1.08
Wyoming	4,237	5,562	+ 31.3	136.7	179.4	46,935	60,058	128.6	164.5	+27.9	3.04	913,270	2.23
Unclassified	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	572	0.00
Total United States	155,754	178,489	+ 14.6	5,024.3	5,757.8	1,840,307	1,972,812	5,041.9	5,405.1	+ 7.2	100.0	40,916,693	100.00

* Data on Louisiana and Texas by districts are from various sources and do not agree with state totals, which are on Bureau of Mines Basis.



Radial Flow Tower
Dehydration Units

25M — 1000 P.S.I. W.P. Dehydration
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United States Crude Oil Production, By States, By Years (Part 1)

Data in thousands of barrels; from *Mineral Resources and Minerals Yearbook*, except where otherwise indicated in footnotes.

Year	Alabama	Arkansas	California	Colorado	Florida	Illinois	Indiana	Kansas	Kentucky	Louisiana	Michigan	Mississippi	Missouri	Montana	Nebraska	New Mexico
1859	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1860	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1861	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1862	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1863	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1864	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1865	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1866	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1867	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1868	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1869	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1870	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1871	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1872	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1873	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1874	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1875	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1876	.....	.....	12	.....	.....	.....	.....	.....	G E	.....	.....	.....	.....	.....	.....	.....
1877	.....	.....	13	.....	.....	.....	.....	.....	G E	.....	.....	.....	.....	.....	.....	.....
1878	.....	.....	15	.....	.....	.....	.....	.....	G E	.....	.....	.....	.....	.....	.....	.....
1879	.....	.....	20	.....	.....	.....	.....	.....	G E	.....	.....	.....	.....	.....	.....	.....
1880	.....	.....	40	.....	.....	.....	.....	.....	G E	.....	.....	.....	.....	.....	.....	.....
1881	.....	.....	100	.....	.....	.....	.....	.....	G E	.....	.....	.....	.....	.....	.....	.....
1882	.....	.....	129	.....	.....	.....	.....	.....	G E	.....	.....	.....	.....	.....	.....	.....
1883	.....	.....	143	.....	.....	.....	.....	.....	G5	.....	.....	.....	.....	.....	.....	.....
1884	.....	.....	262	.....	.....	.....	.....	.....	G4	.....	.....	.....	.....	.....	.....	.....
1885	.....	.....	325	.....	.....	.....	.....	.....	G5	.....	.....	.....	.....	.....	.....	.....
1886	.....	.....	377	.....	.....	.....	.....	.....	G5	.....	.....	.....	.....	.....	.....	.....
1887	.....	.....	678	76	.....	.....	.....	.....	G5	.....	.....	.....	.....	.....	.....	.....
1888	.....	.....	690	298	.....	.....	.....	.....	G5	.....	.....	.....	.....	.....	.....	.....
1889	.....	.....	303	317	.....	1	33	1	G5	.....	.....	.....	H	.....	.....	.....
1890	.....	.....	307	369	.....	1	64	1	G6	.....	.....	.....	H	.....	.....	.....
1891	.....	.....	324	666	.....	1	137	1	G9	.....	.....	.....	H	.....	.....	.....
1892	.....	.....	385	824	.....	1	698	5	G7	.....	.....	.....	H	.....	.....	.....
1893	.....	.....	470	594	.....	1	2,335	18	G3	.....	.....	.....	H	.....	.....	.....
1894	.....	.....	706	516	.....	H	3,689	40	G2	.....	.....	.....	H	.....	.....	.....
1895	.....	.....	1,209	438	.....	H	4,386	44	G2	.....	.....	.....	H	.....	.....	.....
1896	.....	.....	1,253	361	.....	H	4,681	114	G2	.....	.....	.....	H	.....	.....	.....
1897	.....	.....	1,903	385	.....	1	4,122	81	G H	.....	.....	.....	H	.....	.....	.....
1898	.....	.....	2,257	444	.....	H	3,731	72	G6	.....	.....	.....	H	.....	.....	.....
1899	.....	.....	2,642	390	.....	H	3,848	70	G18	.....	.....	.....	H	.....	.....	.....
1900	.....	.....	4,325	317	.....	H	4,874	75	G62	.....	J	.....	J2	.....	.....	.....
1901	.....	.....	8,787	461	.....	H	5,757	179	G137	.....	J	.....	J2	.....	.....	.....
1902	.....	.....	13,984	397	.....	H	7,481	332	G185	549	J	.....	J1	.....	.....	.....
1903	.....	.....	24,382	484	.....	.....	9,186	932	G554	918	J	.....	J3	.....	.....	.....
1904	.....	.....	29,649	501	.....	.....	11,339	4,251	G998	2,959	J	.....	J3	.....	.....	.....
1905	.....	.....	33,428	376	.....	181	10,964	I3,750	G1,217	8,910	J	.....	J3	.....	.....	.....
1906	.....	.....	33,099	328	.....	4,397	7,674	I3,627	G1,214	9,077	J	.....	J3	.....	.....	.....
1907	.....	.....	39,748	332	.....	24,282	5,128	2,410	G821	5,000	J	.....	J4	.....	.....	.....
1908	.....	.....	44,855	380	.....	33,686	3,283	1,801	728	5,789	J	.....	J15	.....	.....	.....
1909	.....	.....	55,472	311	.....	30,898	2,296	1,264	639	3,060	J	.....	J6	.....	.....	.....
1910	.....	.....	73,011	240	.....	33,143	2,160	1,128	469	6,841	J	.....	J4	.....	.....	.....
1911	.....	.....	81,134	227	.....	31,317	1,695	1,279	472	10,721	J	.....	J8	.....	.....	.....
1912	.....	.....	87,269	206	.....	28,602	970	1,593	484	9,263	K	.....	.....	.....	.....	.....
1913	.....	.....	97,788	189	.....	23,894	956	2,375	525	12,499	K	.....	K	.....	.....	K
1914	.....	.....	99,775	223	.....	21,920	1,336	3,104	503	14,309	K	.....	K	.....	.....	.....
1915	.....	.....	86,592	208	.....	19,042	876	2,823	437	18,192	K	.....	K	.....	.....	.....
1916	.....	.....	90,952	197	.....	17,714	769	8,738	I-1,202	15,248	K	.....	K	45	.....	.....
1917	.....	.....	93,878	121	.....	15,777	760	36,536	I-3,088	11,392	K	.....	.....	100	.....	.....
1918	.....	.....	97,532	143	.....	13,366	878	45,451	I-4,368	16,043	K	.....	.....	69	.....	.....
1919	.....	.....	101,183	121	.....	11,960	972	33,048	9,278	17,188	K	.....	K	90	.....	K
1920	.....	K	103,377	111	.....	10,774	945	39,005	8,738	35,714	.....	.....	K	340	.....	K
1921	.....	10,473	112,600	108	.....	10,043	1,158	36,456	9,013	27,103	.....	.....	K	1,509	.....	K
1922	.....	12,712	138,468	97	.....	9,383	1,087	31,766	8,973	35,376	.....	.....	K	2,449	.....	K
1923	.....	36,610	262,876	86	.....	8,707	1,043	28,250	8,069	24,919	.....	.....	K	2,782	.....	K
1924	.....	46,028	228,933	445	.....	8,081	935	28,836	7,407	21,124	.....	.....	.....	2,815	.....	98
1925	.....	77,398	232,492	1,226	.....	7,863	829	38,357	6,759	20,272	4	.....	.....	4,091	.....	1,060
1926	.....	58,332	224,673	2,768	.....	7,760	808	41,498	6,274	23,201	94	.....	.....	7,727	.....	1,666
1927	.....	40,005	231,196	2,831	.....	6,994	852	41,069	6,719	22,818	439	.....	.....	5,058	.....	1,226
1928	.....	32,096	231,811	2,774	.....	6,462	1,052	38,596	7,359	21,847	594	.....	.....	4,015	.....	943
1929	.....	24,917	292,534	2,358	.....	6,319	981	42,813	7,775	20,554	4,528	.....	.....	3,980	.....	1,830
1930	.....	19,702	227,329	1,656	.....	5,736	994	41,638	7,389	23,272	3,911	.....	.....	3,349	.....	10,189
1931	.....	14,791	188,830	1,545	.....	5,039	840	37,018	6,456	21,804	3,789	.....	.....	2,830	.....	15,227
1932	.....	12,051	178,128	1,136	.....	4,673	806	34,848	6,287	21,807	6,910	.....	K	2,457	.....	12,455
1933	.....	11,686	172,010	919	.....	4,244	737	41,976	4,608	25,168	7,942	K	K	2,273	.....	14,116
1934	.....	11,182	174,305	1,139	.....	4,479	838	46,482	4,860	32,869	10,603	K	K	3,603	.....	16,864
1935	.....	11,008	207,832	1,560	.....	4,322	777	54,843	5,258	50,330	15,776	K	K	4,603	.....	20,483
1936	.....	10,469	214,773	1,650	.....	4,475	822	58,317	5,633	80,491	11,928	.....	K	5,868	.....	27,223
1937	.....	11,764	238,521	1,605	.....	7,499	844	70,761	5,484	90,924	16,628	.....	K	5,805	.....	38,854
1938	.....	18,180	249,749	1,412	.....	24,075	995	60,064	5,821	95,208	18,745	.....	K	4,946	.....	35,759
1939	.....	21,238	224,354	1,404	.....	94,912	1,711	60,703	5,621	93,646	23,462	107	40	5,960	2	37,637
1940	.....	25,775	223,881	1,626	.....	147,647	4,978	66,139	5,188	103,584	19,753	4,400	44	6,728	276	39,129
1941	.....	26,327	230,263	2,150	.....	132,393	7,411	83,242	4,762	115,908	16,359	15,327	47	7,526	1,898	39,569
1942	.....	26,628	248,326	2,199	.....	106,391	6,743	97,636	4,534	115,785	21,754	28,833	36	8,074	1,237	31,544
1943	.....	27,600	284,188	2,320	4	82,260	5,283	106,178	7,883	123,592	20,768	18,807	36	7,916	635	38,896
1944	43	29,418	311,793	3,083	12	77,413	5,118	98,762	9,621	129,645	18,490	16,337	45	8,647	417	39,555
1945	181	28,613	326,482	5,036	30	75,094	4,868	96,415	10,325	131,051	17,267	19,062	45	8,420	305	37,351
1946	380	28,375	314,713	11,856	57	75,297	6,726	97,218	10,578	143,669	17,074	24,298	51	8,825	293	36,814
1947	396	29,948	333,132	15,702	259	66,459	6,095	105,132	9,397	160,128	16,215	34,925	55	8,742	229	40,926
1948	466	31,682	340,074	17,878	290	64,808	6,974	110,908	8,801	181,458	16,871	45,761	44	9,382	215	47,969
1949	462	29,936	332,839	23,910	441	64,583	9,556	101,868	8,656	190,715	16,495	37,966	46	9,149	330	47,932
1950P	728	31,293	327,750	23,499	488	62,447	10,154	107,851	10,348	209,247	15,930	38,330	29	8,139	1,423	47,675
Total	2,656	796,237	8,619,638	147,529	1,581	1,506,817	200,038	2,099,788	252,066	2,561,187	322,329	284,153	572	168,312	7,260	682,990

A Utah production estimated at 3,650 barrels in 1939; 3,126 barrels in 1940; and 189,726 barrels cumulative through 1940.

B *Petroleum in the United States and Possessions*, by Arnold and Kemnitzer, shows for Alaska the following data: 1904-1919, estimated, 56,000 barrels; 1920, 11,000 barrels; 1921, 10,000 barrels; 1922-1928, estimated, 73,000 barrels; total, 1904-1928, 150,000 barrels.

C "Unclassified" includes 1912, Alaska and Michigan; 1913, Alaska, Michigan, Missouri and New Mexico; 1914-16, Alaska, Michigan and Missouri; 1917-18, Alaska and Michigan; 1919, Alaska, Michigan, Missouri and New Mexico; 1920. Alaska, Arkansas, Missouri, New Mexico and Utah; 1921-23, Alaska, Missouri and New Mexico; 1924-31, Alaska and Utah; 1932, Alaska, Missouri and Utah; 1933, Alaska, Mississippi, Missouri and Utah; 1934, Mississippi, Missouri and Utah; 1935, Mississippi, Missouri, Tennessee and Utah; 1936-1938; Missouri, Tennessee and Utah.

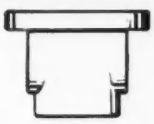
D Pennsylvania and New York separated in years 1864-1881, by aid of *Petroleum in the United States and Possessions*, by Arnold and Kemnitzer.

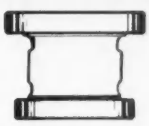
E *Petroleum in the United States and Possessions*, by Arnold and Kemnitzer, gives the following additional estimates which are not shown by the official *Mineral Resources*; Ohio, 1860-1875, 200,000 barrels; West Virginia, 1860-1875, 2,800,000 barrels; Kentucky, 1860-1882, 161,000 barrels.

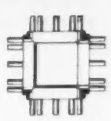
MASS PRODUCTION *Economy*

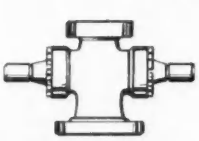
Cameron all forged steel SAFETY XMAS TREES

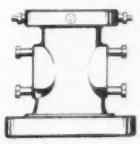
THESE CAMERON FORGED STEEL UNITS ARE AVAILABLE FOR ASSEMBLY IN ANY MAKE CHRISTMAS TREE

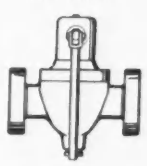

CASING HEAD HOUSINGS

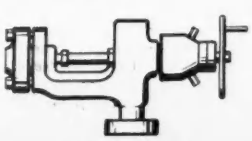

CASING HEAD SPOOLS


FITTINGS


RAM-TYPE TUBING HEADS


LOCK-SCREW TUBING HEADS


LIFT-PLUG VALVES


FLOW WINGS

ADJUSTABLE-POSITIVE CHOKES

Here are three good reasons why more and more production men are switching to Cameron Forged Steel Christmas Trees exclusively: (1) ***A Superior Product:*** Every unit in the assembly is of close-grain, high tensile strength, forged steel . . . the only Christmas tree available in 100% forged steel. (2) ***Economy:*** The Cameron shops are tooled up for mass production . . . from steel billets to finished products . . . of a wide selection of well head equipment. This everything-under-one-roof plan results in manufacturing economies which are passed on to the customer. (3) ***Undivided Responsibility:*** Whereas the responsibility for proper operation and servicing is divided among several manufacturers whose products may be used in a Christmas tree assembly, Cameron assumes the full responsibility for the All-Cameron tree.

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CAMERON IRON WORKS, INC.
P. O. BOX 1212 HOUSTON, TEXAS

EXPORT: 74 TRINITY PLACE, NEW YORK, N. Y.

United States Crude Oil Production, By States, By Years (Part 2)

Data in thousands of barrels; from *Mineral Resources and Minerals Yearbook*, except where otherwise indicated in footnotes.

Year	New York	Ohio	Oklahoma	Pennsylvania	Tennessee	Texas	[A] Utah	Virginia	West Virginia	Wyoming	[B] Alaska	[C] Unclassified	Total United States	Total Value At Wells (Thousands of Dollars)	[O] Average Value per Bbl.
1859	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	2	$ 32	$20.00
1860	.....	[E]	.....	500	.....	.....	.....	.....	[E]	.....	.....	.....	500	4,800	9.60
1861	.....	[E]	.....	2,114	.....	.....	.....	.....	[E]	.....	.....	.....	2,114	1,036	.52
1862	.....	[E]	.....	3,057	.....	.....	.....	.....	[E]	.....	.....	.....	3,057	3,210	1.05
1863	.....	[E]	.....	2,611	.....	.....	.....	.....	[E]	.....	.....	.....	2,611	8,226	3.15
1864	[D F H]	[E]	.....	[D F] 2,116	.....	.....	.....	.....	[E]	.....	.....	.....	2,116	20,897	8.15
1865	[D] 100	[E]	.....	[D] 2,398	.....	.....	.....	.....	[E]	.....	.....	.....	2,498	16,460	6.59
1866	[D] 144	[E]	.....	[D] 3,454	.....	.....	.....	.....	[E]	.....	.....	.....	3,598	13,455	3.75
1867	[D] 134	[E]	.....	[D] 3,213	.....	.....	.....	.....	[E]	.....	.....	.....	3,347	8,067	2.40
1868	[D] 146	[E]	.....	[D] 3,500	.....	.....	.....	.....	[E]	.....	.....	.....	3,646	13,217	3.62
1869	[D] 169	[E]	.....	[D] 4,046	.....	.....	.....	.....	[E]	.....	.....	.....	4,215	23,730	5.60
1870	[D] 211	[E]	.....	[D] 5,050	.....	.....	.....	.....	[E]	.....	.....	.....	5,261	20,504	3.90
1871	[D] 208	[E]	.....	[D] 4,997	.....	.....	.....	.....	[E]	.....	.....	.....	5,205	22,591	4.40
1872	[D] 252	[E]	.....	[D] 6,041	.....	.....	.....	.....	[E]	.....	.....	.....	6,293	21,440	3.75
1873	[D] 396	[E]	.....	[D] 9,498	.....	.....	.....	.....	[E]	.....	.....	.....	9,894	18,100	1.80
1874	[D] 437	[E]	.....	[D] 10,490	.....	.....	.....	.....	[E]	.....	.....	.....	10,927	12,648	1.15
1875	[D] 352	[E]	.....	[D] 8,436	.....	.....	.....	.....	[E]	.....	.....	.....	8,788	7,368	.97
1876	[D] 359	32	.....	[D] 8,610	[G]	.....	.....	.....	120	.....	.....	.....	9,133	22,983	2.52
1877	[D] 525	30	.....	[D] 12,610	[G]	.....	.....	.....	172	.....	.....	.....	13,350	31,789	2.38
1878	[D] 607	38	.....	[D] 14,557	[G]	.....	.....	.....	180	.....	.....	.....	15,397	18,045	1.17
1879	[D] 787	29	.....	[D] 18,898	[G]	.....	.....	.....	180	.....	.....	.....	19,914	17,211	.86
1880	[D] 1,041	39	.....	[D] 24,987	[G]	.....	.....	.....	179	.....	.....	.....	26,286	24,601	.94
1881	[D] 1,095	34	.....	[D] 26,281	[G]	.....	.....	.....	151	.....	.....	.....	27,661	25,448	.92
1882	6,685	40	.....	23,368	[G]	.....	.....	.....	128	.....	.....	.....	30,350	23,631	.78
1883	4,004	47	.....	19,125	[G]	.....	.....	.....	126	.....	.....	.....	23,450	25,790	1.10
1884	3,231	90	.....	20,541	[G]	.....	.....	.....	90	.....	.....	.....	24,218	20,596	.85
1885	2,658	662	.....	18,118	[G]	.....	.....	.....	91	.....	.....	.....	21,859	19,198	.88
1886	2,151	1,783	.....	23,647	[G]	.....	.....	.....	102	.....	.....	.....	28,065	19,996	.71
1887	2,075	5,023	.....	20,281	[G]	.....	.....	.....	145	.....	.....	.....	28,283	18,877	.67
1888	1,789	10,011	.....	14,700	[G]	.....	.....	.....	119	.....	.....	.....	27,612	17,948	.65
1889	1,897	12,472	.....	19,591	[G]	[H]	.....	.....	544	.....	.....	.....	35,164	26,963	.77
1890	1,658	16,125	.....	26,800	[G]	.....	.....	.....	493	.....	.....	.....	45,824	35,365	.77
1891	1,585	17,740	[H]	31,424	[G]	[H]	.....	.....	2,406	.....	.....	.....	54,293	30,527	.56
1892	1,273	16,363	[H]	27,149	[G]	[H]	.....	.....	3,810	.....	.....	.....	50,515	25,907	.51
1893	1,032	16,249	[H]	19,283	[G]	[H]	.....	.....	8,446	.....	.....	.....	48,431	28,950	.60
1894	942	16,792	[H]	18,078	[G]	[H]	.....	.....	8,577	2	.....	.....	49,344	35,522	.72
1895	913	19,545	[H]	18,231	[G]	[H]	.....	.....	8,120	4	.....	.....	52,892	57,632	1.09
1896	1,205	23,941	[H]	19,379	[G]	1	.....	.....	10,020	3	.....	.....	60,960	58,519	.96
1897	1,279	21,561	1	17,983	[G]	66	.....	.....	13,090	4	.....	.....	60,476	40,874	.68
1898	1,205	18,739	.....	14,743	[G]	546	.....	.....	13,615	6	.....	.....	55,364	44,193	.80
1899	1,321	21,142	.....	13,054	[G]	669	.....	.....	13,911	6	.....	.....	57,071	64,604	1.13
1900	1,301	22,363	6	13,258	[G]	836	.....	.....	16,196	6	.....	.....	63,621	75,989	1.19
1901	1,207	21,648	10	12,625	[G]	4,394	.....	.....	14,177	5	.....	.....	69,389	66,417	.96
1902	1,120	21,014	37	12,064	[G]	18,084	.....	.....	13,513	6	.....	.....	88,767	71,179	.80
1903	1,163	20,480	139	11,355	[G]	17,956	.....	.....	12,900	9	.....	.....	100 461	94,694	.94
1904	1,113	18,877	1,367	11,126	[G]	22,241	.....	.....	12,645	12	[N]	.....	117,081	101,175	.86
1905	1,118	16,347	[I] 8,264	10,437	[G]	28,136	.....	.....	11,578	8	.....	.....	134,717	84,157	.62
1906	1,243	14,788	[I] 18,091	10,257	[G]	12,568	.....	.....	10,121	7	.....	.....	126,494	92,445	.73
1907	1,212	12,207	43,524	10,000	[G]	12,323	[M]	.....	9,095	[M] 9	[N]	.....	166,095	120,107	.72
1908	1,160	10,859	45,799	9,424	.....	11,207	[M]	.....	9,523	[M] 18	.....	.....	178,527	129,079	.72
1909	1,135	10,633	47,859	9,299	.....	9,534	[M]	.....	10,745	[M] 20	.....	.....	183,171	128,329	.70
1910	1,054	9,916	52,029	8,795	.....	8,899	[M]	.....	11,753	[M] 115	.....	.....	209,557	127,900	.61
1911	953	8,817	56,069	8,248	.....	9,526	[M]	.....	9,796	[M] 187	[N]	.....	220,449	134,045	.61
1912	874	8,969	51,427	7,838	.....	11,735	[M]	.....	12,129	[M] 1,572	[K]	4	222,935	164,213	.74
1913	948	8,781	63,579	7,917	.....	15,010	[N]	.....	11,567	2,407	[K]	11	248,446	237,121	.95
1914	939	8,536	73,632	8,170	.....	20,068	[N]	.....	9,680	3,560	[K]	8	265,763	214,125	.81
1915	888	7,825	97,915	7,838	.....	24,943	[N]	.....	9,265	4,246	[K]	14	281,104	179,463	.64
1916	874	7,744	107,072	7,593	[L] 1	27,645	[N]	.....	8,731	6,234	[K]	8	300,767	330,900	1.10
1917	880	7,751	107,508	7,733	[L] 12	32,413	[N]	.....	8,379	8,978	[K]	10	335,316	522,635	1.56
1918	809	7,285	103,347	7,408	[L] 8	38,750	[N]	.....	7,867	12,596	[K]	8	355,928	703,944	1.98
1919	851	7,736	86,911	8,137	15	79,366	[N]	.....	8,327	13,172	[K]	12	378,367	760,266	2.01
1920	906	7,400	106,206	7,438	14	96,868	[K]	.....	8,249	16,831	[K]	13	442,929	1,360,745	3.07
1921	988	7,335	114,634	7,418	12	106,165	.....	.....	7,822	19,333	[K]	12	472,183	814,745	1.73
1922	1,000	6,781	149,571	7,425	10	118,684	.....	.....	7,021	26,715	[K]	13	557,531	895,111	1 61
1923	1,250	7,085	160 929	7,609	8	131,023	.....	.....	6,358	44,785	[K]	18	732,407	978,430	1.34
1924	1,440	6,811	173,538	7,486	10	134,522	[K]	.....	5,920	39,498	[K]	13	713,940	1,022,683	1 43
1925	1,695	7,212	176,768	8,097	24	144,648	[K]	.....	5,763	29.173	[K]	12	763,743	1,284,960	1.68
1926	1,956	7,272	179,195	8,961	43	166,916	[K]	.....	5,946	25,776	[K]	8	770.874	1,447,760	1 88
1927	2,242	7,593	277,775	9,526	60	217,389	[K]	.....	6,023	21,307	[K]	7	901,129	1,172,830	1 30
1928	2,603	7,015	249,857	9,956	46	257,320	[K]	.....	5,661	21,461	[K]	6	901,474	1,054.880	1.17
1929	3,377	6,743	255,004	11,820	19	296,876	[K]	.....	5,574	19,314	[K]	7	1,007,323	1,280.417	1.27
1930	3,647	6.486	216,486	12.803	21	290,457	[K]	.....	5,071	17,868	[K]	7	898,011	1,070,200	1.19
1931	3,363	5,327	180,574	11,892	6	332,437	[K]	.....	4,472	14,834	[K]	7	851,081	550.630	.65
1932	3,508	4,644	153.244	12,412	5	312,478	[K]	.....	3,876	13.418	[K]	16	785.159	680,460	.87
1933	3.181	4.235	182,251	12,624	5	402,609	[K]	.....	3,815	11.227	[K]	30	905.656	608,000	.67
1934	3.804	4.234	180,107	14,478	10	381,516	[K]	.....	4,095	12,556	.....	41	908,065	904.825	1.00
1935	4,236	4,082	185,288	15,810	[K]	392,666	[K]	.....	3,902	13,755	.....	65	996,596	961.440	.96
1936	4,663	3,847	206,555	17.070	[K]	427,411	[K]	.....	3,847	14,582	.....	63	1.099.687	1,199,820	1.09
1937	5,478	3,559	228.839	19,189	[K]	510,318	[K]	.....	3,845	19,166	.....	77	1.279,160	1,513,340	1.18
1938	5,045	3.298	174.994	17,426	[K]	475.850	[K]	.....	3,684	19,022	.....	82	1,214,355	1,373,060	1.13
1939	5.098	3,156	159,913	17,382	50	483.528	4	.....	3,580	21,454	.....	.....	1,264,962	1,294,470	1.02
1940	4,999	3,159	156,164	17,353	24	493,209	3	.....	3,444	25,711	.....	.....	1,353,214	1,385.440	1.02
1941	5,185	3,510	154,702	16,750	12	505,572	4	.....	3,433	29,878	.....	.....	1,402,228	1,602,000	1.14
1942	5,421	3,543	140,690	17,779	9	483,097	.....	.....	3,574	32,812	.....	.....	1,386,645	1,643,470	1.19
1943	5.059	3.322	123.152	15,757	10	594,343	.....	2	3.349	34.253	.....	.....	1,505,613	1,809.020	1.20
1944	4,697	2,937	124,616	14,118	8	746.699	.....	4	3,070	33.356	.....	.....	1,677,904	2,032,960	1.21
1945	4,648	2,828	139,299	12,515	8	754,710	.....	4	2,879	36.219	.....	.....	1,713,655	2,094.250	1.22
1946	4,863	2,908	134,794	12,996	10	760,215	.....	23	2,929	38,977	.....	.....	1.733.939	2,442,550	1.41
1947	4,762	3,108	141,019	12,690	8	820,210	.....	61	2,617	44,772	.....	.....	1,856,987	3,577,890	1.93
1948	4,621	3,600	154,455	12 667	6	903,498	.....	33	2,692	55,032	.....	.....	2,020,185	5,245.080	2.60
1949	4,248	3,433	151,902	11,374	22	743,990	637	43	2,839	46.935	.....	.....	1,840,307	4,692.783	2.55
1950[P]	4,322	3,350	164,722	11,710	21	829,287	1,192	21	2,798	60,058	.....	.....	1,972,812	5,070,127	2.57
Total..	177,013	620,916	6,261,829	1,125,014	517	13,721,428	1,840	191	440,950	913.270	.....	572	40,916,693	58,353,509	1.43

[F] New York included with Pennsylvania.

[G] Tennessee included with Kentucky, 1876-1907, inclusive.

[H] Less than 500 barrels.

[I] Figures for Oklahoma and Kansas for years 1905-1906 shown together by *Mineral Resources*; here divided by aid of *Petroleum in the United States and Possessions*, by Arnold and Kemnitzer.

[J] Michigan shown with Missouri in 1900-1911.

[K] Included under "Unclassified."

[L] Kentucky and Tennessee figures in years 1916-18 obtained with aid of *Mineral Resources* and *Petroleum in the United States and Possessions*, by Arnold and Kemnitzer.

[M] Insignificant production of Utah (mostly used as fuel) shown with Wyoming.

[N] Little production but no record available.

[O] Figures on average price per barrel for years 1859-1875 taken from *Petroleum in the United States and Possessions*, by Arnold and Kemnitzer; remainder from *Mineral Resources* and *Minerals Yearbook* except 1949 and 1950 estimated.

[P] Bureau of Mines figures for first 10 months; November and December estimated by WORLD OIL, with aid of weekly reports of American Petroleum Institute and other sources.

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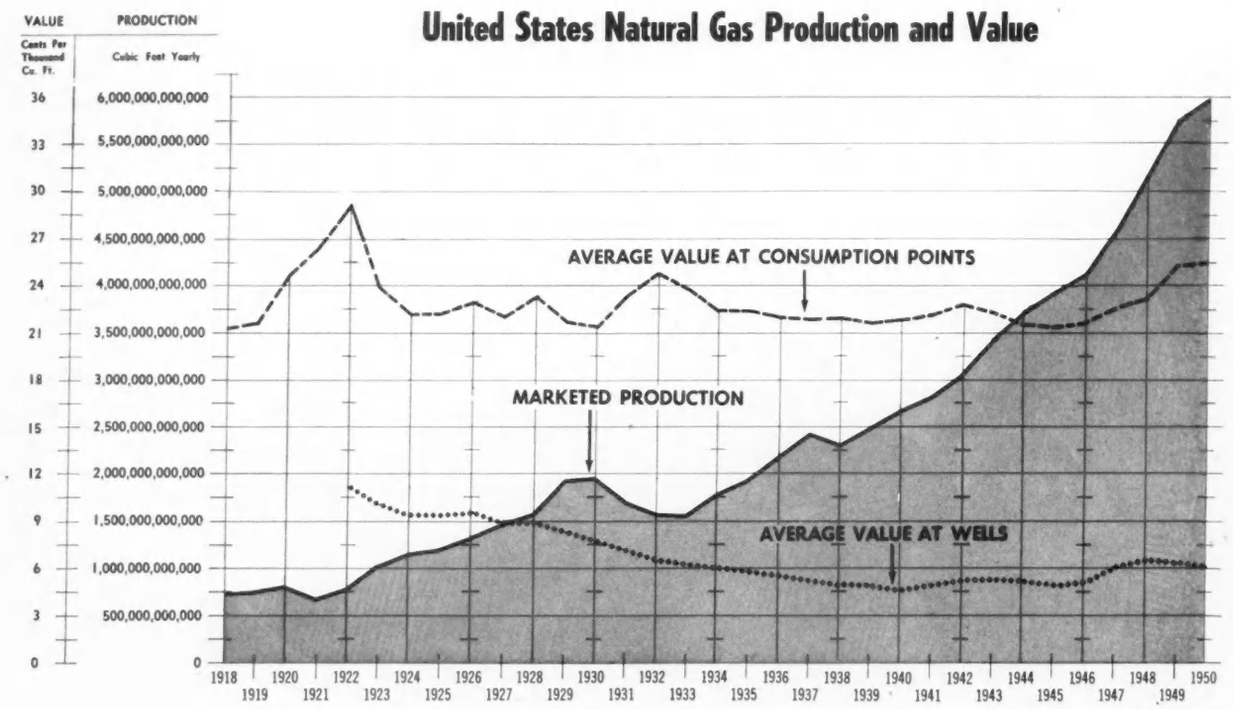
NATURAL GAS

To Continue Record Expansion

THE spectacular growth of the U. S. natural gas industry that began at the end of World War II was even more marked in 1950 than in previous years. Production, revenues, sales and number of new customers reached new levels last year. With additional distribution systems to be in operation during 1951, there is every indication that further expansion will occur in the year ahead.

Natural gas transmission systems are to bring natural gas into new areas during 1950, in addition to making larger quantities available in some regions already receiving gas. During the first nine months of 1950, the Federal Power Commission approved construction of 5750 miles of new natural gas transmission lines and had applications pending for an additional 12,400 miles. Natural gas is expected to reach the New England states before the end of 1951. One application to supply a part of this territory has been approved and another application is pending. This will leave only one im-



YEAR	*No. of Producing Wells	Marketed Production (Millions of Cubic Feet)	Average Value (Cents per Thousand Cubic Feet) At Wells	Average Value (Cents per Thousand Cubic Feet) At Points of Consumption
1918	†40,369	721,001	‡	21.3
1919	†41,500	745,916	‡	21.6
1920	†42,700	798,210	‡	24.6
1921	†43,900	662,052	‡	26.4
1922	†45,100	762,546	11.1	29.1
1923	†46,300	1,006,976	10.0	23.8
1924	†47,500	1,141,521	9.3	22.2
1925	†48,700	1,188,571	9.4	22.3
1926	†49,900	1,313,019	9.5	22.9
1927	†51,100	1,445,428	8.8	22.0
1928	†52,300	1,568,139	8.9	23.2
1929	53,545	1,917,693	8.2	21.6
1930	55,020	1,943,421	7.6	21.4
1931	55,756	1,686,436	7.0	23.3
1932	54,160	1,555,990	6.4	24.7
1933	53,660	1,555,474	6.2	23.7
1934	54,130	1,770,721	6.0	22.3
1935	53,700	1,916,595	5.8	22.4
1936	53,960	2,167,802	5.5	22.0
1937	55,050	3,407,620	5.1	21.9
1938	53,770	2,295,562	4.9	21.8
1939	53,530	2,476,756	4.9	21.6
1940	53,880	2,660,222	4.5	21.7
1941	55,500	2,812,658	4.9	22.1
1942	56,150	3,053,475	5.1	22.7
1943	57,200	3,414,689	5.2	22.3
1944	58,780	3,711,039	5.1	21.5
1945	60,660	3,918,686	4.9	21.4
1946	62,740	4,030,605	5.3	22.0
§1947	63,670	4,582,173	6.0	22.5
1948	‡	5,148,020	6.5	23.2
1949	‡	5,419,736	6.3	25.4
†1950	‡	5,975,000	6.1	25.5

Source: U. S. Bureau of Mines. * Only dry natural gas producing wells included. † Estimated. ‡ Not available. § Beginning of new basis; includes gas stored and lost in transmission.

Summary of Annual Estimates of U. S. Reserves of Natural Gas and Natural Gas Liquids

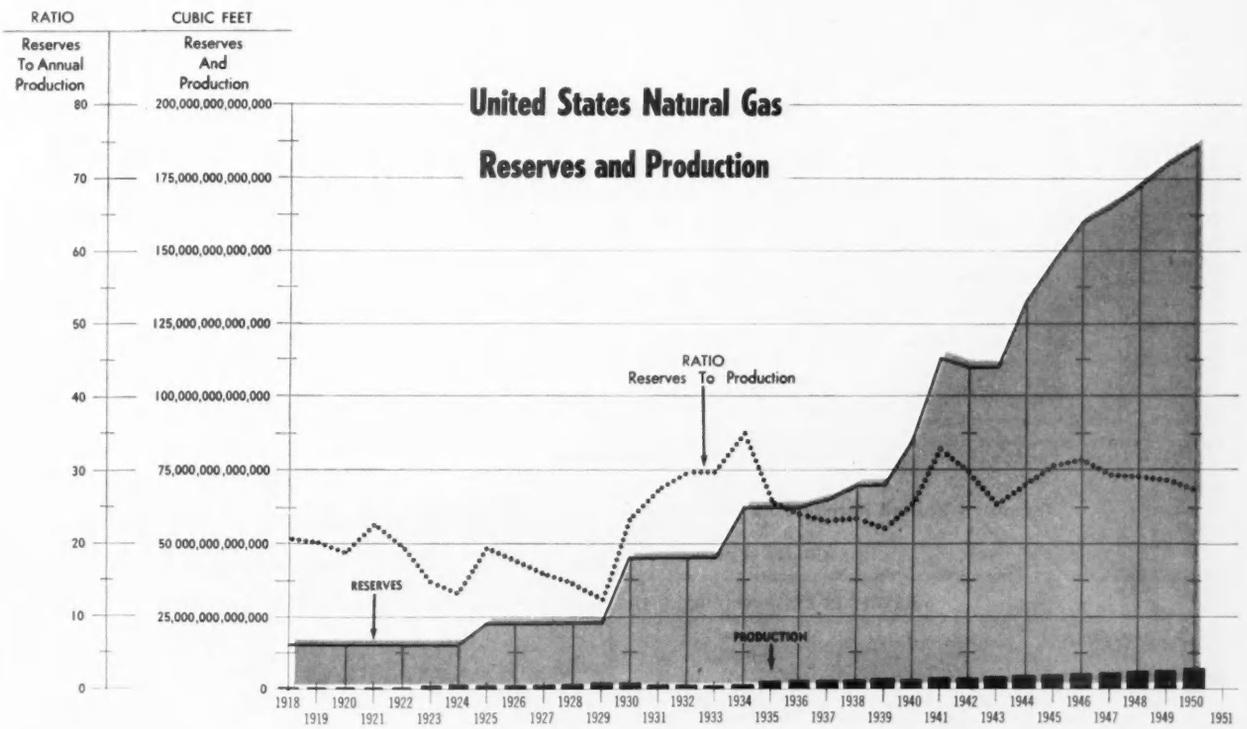
(Source: American Gas Association and American Petroleum Institute.)

(Natural gas data in millions of cubic feet—14.65 psia, at 60° F.)

(Natural gas liquids in thousands of barrels of 42 U. S. gallons.)

YEAR	Estimated Proved Reserves Beginning of Year (1)	CHANGES IN RESERVES DURING YEAR: (Add.) Reserves Proved: Extensions and Revisions (2)	Discoveries of New Fields and New Pools in Old Fields (3)	Total Reserves Proved During Year (Cols. 2+3) (4)	(Add or Deduct) Net Change in Storage (5)	(Deduct) Net Production During Year (6)	(Net Change) Increase or Decrease (Cols. 4+5—6) (7)	Estimated Proved Reserves End of Year (Cols. 1 1+7) (8)	Ratio of Year-End Reserves to Year's Prod. (Year's Supply) Col. 8÷ Col. 6 (9)
Natural Gas:									
1945	.....	.....	.....	.....	.....	.....	.....	147,789,367	....
1946	147,789,367	.....	.....	17,729,152	*	4,942,617	+12,786,535	160,575,901	32.5
1947	160,575,901	7,570,654	3,410,170	10,980,824	*	5,629,811	+5,351,013	165,926,914	29.5
1948	165,926,914	9,769,483	4,129,089	13,898,572	+51,482	6,007,628	+7,942,426	173,869,340	28.9
1949	173,869,340	8,061,429	4,612,870	12,674,299	+82,746	6,245,041	+6,512,004	180,381,344	28.9
†1950	180,381,344	.....	.....	12,500,000	+75,000	6,800,000	+5,775,000	186,156,344	27.4
Natural Gas Liquids:									
1946	.....	.....	.....	.....	.....	129,262	.....	3,163,219	24.5
1947	3,163,219	192,237	59,301	251,538	.....	160,782	+ 90,756	3,253,975	20.2
1948	3,253,975	405,874	64,683	470,557	.....	183,749	+286,808	3,540,783	19.3
1949	3,540,783	294,211	92,565	386,776	.....	198,547	+188,229	3,729,012	18.8
†1950	3,729,012	.....	.....	425,000	.....	‡228,949	+196,051	3,925,063	17.1

* Not Estimated. † Estimated by WORLD OIL. ‡ Includes 180,922 plant production of natural gasoline, etc.; 26,027 lease condensate; estimated 22,000 losses and waste.



YEAR	Reserves at End of Year (Billions of Cubic Feet)	Authority for Estimate of Reserves	Marketed Production (Billions of Cubic Feet)	Years' Supply in Reserve
1918	15,000	E. Holley Poe et al. in report	721	20.8
1919	15,000	September 23, 1947	746	20.1
1920	15,000	" " "	798	18.8
1921	15,000	" " "	662	22.7
1922	15,000	" " "	763	19.7
1923	15,000	" " "	1,007	14.9
1924	15,000	" " "	1,142	13.1
1925	23,000	*Gas Facts, 1945 and 1946*	1,189	19.3
1926	23,000	" "	1,313	17.5
1927	23,000	" "	1,445	15.9
1928	23,000	" "	1,568	14.7
1929	23,000	" "	1,918	12.0
1930	46,000	Earl P. Hines, then Cities Service	1,943	23.7
1931	46,000	Co.	1,686	27.3
1932	46,000	" " "	1,556	29.6
1933	46,000	" " "	1,555	29.6
1934	62,000	Ralph E. Davis, Consulting Engineer	1,771	35.0
1935	62,000	Ralph E. Davis, Consulting	2,408	25.7
1936	62,000	Engineer	2,571	24.1
1937	66,000	" " "	2,854	23.1
1938	70,000	Lyon F. Terry, Chase Nat'l. Bank	2,960	23.6
1939	70,000	" " "	3,162	22.1
1940	85,000	Ralpy E. Davis, Consulting Engineer	3,331	25.5
1941	113,800	Petroleum Administration for War	3,459	32.9
1942	110,000	" " "	3,701	29.7
1943	110,000	" " "	4,336	25.4
1944	133,500	" " "	4,731	28.2
1945	147,789	American Gas Association	4,840	30.5
1946	160,576	" "	5,152	31.2
*1947	165,927	" "	5,650	29.4
1948	173,869	" "	5,958	29.2
1949	180,381	" "	6,245	28.9
1950	186,156	World Oil Estimate	6,800	27.4

* Beginning of new basis; includes gas stored and lost in transmission.

portant area in the U. S. without natural gas, and several plans are under consideration for bringing gas to the Pacific Northwest.

An important development which will have considerable influence on marketed production in 1951 was the commencement of deliveries to New York City, Brooklyn and Newark during the closing days of 1950. This is being achieved through a 1900-mile pipe line, the longest in the world, from the Gulf Coast region. Another significant advance in 1950 was the linking of San Francisco area consumers with gas wells of West Texas, New Mexico and the Texas Panhandle.

Preliminary figures indicate marketed production of natural gas in 1950 totaled 5975 billion cubic feet, an increase of 555 billion cubic feet over 1949. At this level, marketed production was almost twice that of 1942 and 52 percent greater than in 1945. Total net production of natural gas, including volumes used in the field in addition to marketed quantities, are estimated to have reached 6.8 trillion cubic feet compared with 6¼ trillion cubic feet the preceding year. Net production was 8.9 percent more than in 1949, in contrast with a 4 percent gain achieved during 1949.

Approximately 60 percent of the marketed production was for utility sales to consumers.

(See Table on Page 152)

Estimated Proved Recoverable Reserves of Natural Gas Liquids in the United States, by States

Includes Condensate, Natural Gasoline and Liquefied Petroleum Gas.
(Source: American Gas Association and American Petroleum Institute.)
(Thousands of Barrels of 42 U. S. Gallons)

	Reserves as of Dec. 31, 1948	CHANGES IN RESERVES DURING 1949			RESERVES AS OF DECEMBER 31, 1949			
		Extensions and Revisions	Discoveries of New Fields and New Pools in Old Fields	Net Production	Total (Columns 6 + 7 + 8, also Columns 1 + 2 + 3 Less Column 4)	Non-Associated	Associated	Dissolved
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Arkansas	57,457	1,149	128	3,092	55,642	35,338	7,865	12,439
California	307,908	29,996	9,560	27,189	320,275	.....	108,564	211,711
Colorado	36,299	(—)5,307	25	6,827	24,190	906	.....	23,284
Illinois	24,162	6,238	81	3,815	26,666	28	75	26,563
Indiana	108	29	20	31	126	25	.....	101
Kansas	102,344	6,573	113	2,625	106,405	102,612	1,491	2,302
Kentucky	14,401	315	157	1,628	13,245	13,245	.....	.....
Louisiana	524,096	81,174	17,821	26,669	596,422	447,929	99,122	49,371
Michigan	1,066	238	18	119	1,203	728	.....	475
Mississippi	57,564	1,440	101	2,698	56,407	24,173	25,945	6,289
Montana	4,000	(—)80	20	230	3,710	3,545	30	135
New Mexico	80,247	9,152	736	4,416	85,719	24,523	38,889	22,307
Ohio	1,664	119	13	126	1,670	1,670*	.....	.....
Oklahoma	200,388	43,062	7,952	17,372	234,030	103,063	21,900	109,067
Pennsylvania	2,645	158	79	239	2,643	2,643*	.....	.....
Texas	2,074,674	110,442	54,794	96,199	2,143,711	1,303,100	323,898	516,713
Utah	209	7	2	10	208	206	.....	2
West Virginia	15,214	1,107	369	3,859	12,831	12,831*	.....	.....
Wyoming	36,307	8,416	540	1,400	43,863	28,055	2,979	12,829
†Miscellaneous	30	(—)17	36	3	46	.....	33	13
Total	3,540,783	294,211	92,565	198,547	3,729,012	2,104,620	630,791	993,601

* Not allocated by types, but occurring principally in column shown.
† Includes Alabama, Florida, Missouri, Nebraska, New York, Virginia and Maryland.

Natural Gas Customers, Sales and Revenues

(Source: American Gas Association)

	1949 Actual	1950 Estimate	Percent Change
Customers, End of Year	13,210,000	14,894,000	+12.7
Residential	12,072,000	13,650,000	+13.1
Commercial	1,077,000	1,175,000	+ 9.1
Industrial	51,000	54,000	.....
Other	10,000	15,000	.....
Sales, Thousand Cubic Feet	3,107,865,000	3,694,000,000	+18.9
Residential	913,300,000	1,119,000,000	+22.5
Commercial	300,441,000	333,000,000	+10.8
Industrial	1,775,821,000	2,121,000,000	+19.4
Other	118,303,000	121,000,000	+ 2.3
Revenues	$1,090,735,000	$1,363,000,000	+25.0
Residential	590,980,000	759,000,000	+28.4
Commercial	144,652,000	169,000,000	+16.8
Industrial	335,454,000	414,000,000	+23.4
Other	19,649,000	21,000,000	+ 6.9

Estimated Proved Recoverable Reserves of Natural Gas in the United States, by States

Source: American Gas Association
(Millions of Cubic Feet—14.65 psia, at 60 Deg. F.)

	CHANGES IN RESERVES DURING 1949 (b)					RESERVES AS OF DECEMBER 31, 1949 (b)				
	Reserves as of Dec. 31, 1948	Extensions and Revisions	Discoveries of New Fields and New Pools in Old Fields	(c) Net Change in Underground Storage	(d) Net Production	Total (Columns 7+ 8 + 9 + 10, also Columns 1 + 2 + 3 + 4 Less Column 5)	(e) Non-Associated	(f) Associated	(g) Dissolved	(h) Underground Storage
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Arkansas	901,838	27,739	3,783	15	59,185	874,190	438,861	161,224	272,645	1,460
California	10,192,593	151,526	187,899	3,105	543,488	9,991,635	2,773,105	2,357,637	4,845,763	15,130
Colorado	1,349,179	(—)102,384	5,128	.....	24,828	1,227,095	580,442	33,603	613,050	.....
Illinois	227,804	29,378	16,140	.....	40,130	233,192	5,692	15,000	212,500	.....
Indiana	21,600	5,890	3,960	.....	6,250	25,200	5,000	.....	20,200	.....
Kansas	14,407,832	(—)8,123	10,855	2,279	323,283	14,089,560	13,702,217	127,988	230,206	29,149
Kentucky	1,378,151	50,381	8,400	2,465	90,000	1,349,397	1,270,903	.....	66,000	12,494
Louisiana	23,977,520	2,238,587	1,277,430	.....	805,726	26,687,811	20,954,929	4,135,685	1,597,197	.....
Michigan	182,987	39,514	3,683	6,165	17,438	214,911	145,642	.....	47,495	21,774
Mississippi	2,504,336	81,499	12,084	.....	68,950	2,528,969	1,764,540	415,030	349,399	.....
Montana	852,605	(—)16,646	4,021	1,416	37,925	803,471	767,051	6,088	27,341	2,991
New Mexico	5,606,361	737,698	146,287	7,363	256,706	6,241,003	3,137,497	2,252,569	839,734	11,203
New York	67,615	225	.....	2,545	3,700	66,685	56,310	.....	660	9,715
Ohio	629,453	42,264	9,225	18,629	47,000	652,571	549,097	.....	36,500	66,974
Oklahoma	11,332,445	606,335	251,012	3,522	567,335	11,625,979	7,873,220	969,132	2,767,508	16,119
Pennsylvania	617,410	48,148	8,700	17,422	70,000	621,680	520,069	.....	43,250	58,361
Texas	95,708,553	3,963,647	2,521,917	.....	3,023,714	99,170,403	68,579,797	16,959,726	13,630,880	.....
Utah	69,798	1,754	338	.....	6,313	65,577	65,269	.....	308	.....
West Virginia	1,737,167	116,372	24,500	17,194	180,000	1,715,233	1,587,107	.....	85,500	42,626
Wyoming	2,093,740	43,692	107,958	626	72,339	2,173,677	1,328,615	148,290	696,298	474
Miscellaneous (a)	10,353	3,933	9,550	.....	731	23,105	12,141	6,700	4,264	.....
Total	173,869,340	8,061,429	4,612,870	82,746	6,245,041	180,381,344	126,117,504	27,588,672	26,386,698	288,470

(a) Includes Alabama, Florida, Missouri, Nebraska, Virginia and Maryland. (b) Excludes gas loss due to natural gas liquids recovery. (c) The net difference between gas stored in and gas withdrawn from underground storage reservoirs. (d) Net production equals gross withdrawals less gas injected into underground reservoirs; changes in underground storage are excluded. December production estimated occasionally. (e) Non-associated gas is free gas not in contact with crude oil in the reservoirs. (f) Associated gas is free gas in contact with crude oil in the reservoirs. (g) Dissolved gas is gas in solution with crude oil in the reservoirs. (h) Gas held in undergorund reservoirs for storage purposes only.

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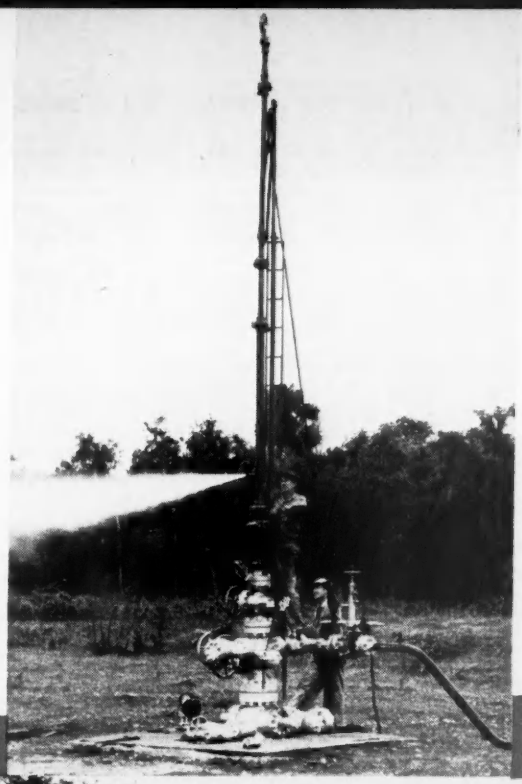

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United States Marketed Production of Natural Gas, By States, By Years

(Millions of Cubic Feet)

Sources: U. S. Bureau of Mines, except for some figures for early years which are from "Petroleum in the United States and Possessions" by Ralph Arnold and William Kemnitzer, and except where otherwise indicated by footnotes.

YEAR	Arkansas	California	Colorado	Illinois	Indiana	Kansas	Kentucky	Louisiana	Michigan	Mississippi	Montana	New Mexico	New York
*Pre–1906	281	9,810	631	1,505	471,800	81,865	13,243	31	.....	.....	.....	.....	31,340
1906	21	153	23	410	7,861	69,323	789	39	.....	.....	.....	.....	2,548
1907	*570	230	57	1,155	6,624	76,707	1,303	88	.....	.....	.....	.....	3,288
1908	*1,208	479	50	4,979	5,256	80,740	1,430	252	.....	.....	.....	.....	3,843
1909	*1,778	2,324	*45	8,473	6,159	75,074	2,097	1,365	1	.....	.....	.....	4,696
1910	*2,412	2,764	*40	6,723	5,760	59,380	1,357	4,110	1	.....	.....	.....	6,010
1911	*1,994	6,390	*35	6,762	4,365	38,800	1,275	9,786	2	.....	.....	.....	5,240
1912	*1,465	9,355	*30	5,603	3,618	28,068	1,951	14,493	2	.....	.....	.....	8,626
1913	*806	11,035	*27	4,767	2,921	22,884	1,821	26,653	2	.....	.....	.....	8,515
1914	*633	17,829	*24	3,548	2,580	22,628	1,422	26,775	2	.....	.....	.....	8,935
1915	992	21,891	*21	2,690	2,261	27,046	1,667	25,540	2	.....	6	.....	7,977
1916	2,388	31,643	*18	3,534	1,715	31,710	2,107	32,081	1	.....	213	.....	8,036
1917	5,610	49,427	*14	4,439	1,712	24,439	2,802	31,287	1	.....	334	.....	8,372
1918	5,295	39,719	10	4,473	1,667	27,825	3,022	36,094	1	.....	177	.....	8,461
1919	5,587	55,607	10	3,825	1,407	16,150	2,057	47,062	1	.....	858	.....	8,124
1920	9,027	66,041	8	3,013	1,779	21,158	3,345	58,274	.....	.....	818	.....	8,419
1921	4,260	75,942	4	2,646	1,066	15,717	4,820	58,004	.....	.....	336	.....	6,583
1922	9,700	84,580	4	3,383	947	20,289	5,872	70,267	1	.....	486	.....	6,947
1923	24,215	131,434	1	4,049	880	30,913	11,953	112,031	1	.....	1,470	.....	6,497
1924	36,616	189,692	48	4,072	998	25,580	12,875	160,945	1	.....	1,071	.....	6,196
1925	41,878	187,789	574	4,165	1,168	26,917	10,770	152,620	.....	.....	1,496	.....	6,210
1926	43,566	204,915	554	3,808	901	38,095	10,410	157,423	.....	.....	2,283	921	7,027
1927	30,450	212,364	1,725	3,741	1,124	42,646	10,206	186,961	1	.....	4,253	1,019	5,908
1928	20,235	246,215	2,931	3,051	1,290	45,644	15,383	227,821	469	.....	6,277	838	7,224
1929	19,928	342,214	2,787	2,983	1,012	38,469	27,588	261,138	4,526	90	9,659	3,054	,387
1930	18,585	334,789	3,312	2,890	1,217	37,630	28,023	278,341	2,075	179	10,060	9,497	,624
1931	13,300	305,930	2,536	2,130	1,337	38,742	27,870	224,155	472	6,048	10,949	19,354	,868
1932	10,235	263,484	2,547	1,769	1,349	40,690	29,005	201,561	968	8,648	13,295	17,604	,813
1933	8,288	259,799	2,449	1,631	1,544	41,596	31,380	197,826	1,528	8,679	14,391	19,148	3,865
1934	7,024	268,122	2,633	1,868	1,802	46,909	33,124	225,713	2,789	8,245	14,971	24,075	6,278
1935	6,167	284,109	2,843	1,448	1,777	57,125	39,738	249,450	4,203	9,643	19,870	27,931	8,288
1936	8,500	320,406	3,687	865	2,241	69,178	43,903	290,151	7,167	11,821	23,003	33,928	12,431
1937	9,690	329,769	3,186	1,040	1,551	83,890	55,719	315,301	9,080	13,348	24,765	46,337	21,325
1938	11,301	315,168	1,904	1,169	1,299	75,203	46,163	283,859	10,165	13,656	21,216	50,706	39,402
1939	10,107	348,361	2,015	2,746	791	80,556	47,771	294,370	10,726	14,527	23,178	60,284	29,222
1940	14,379	351,950	2,533	8,359	1,137	90,003	53,056	343,191	12,648	6,365	26,231	63,990	12,187
1941	19,148	374,905	3,256	10,053	1,522	111,121	69,067	403,855	13,916	4,268	28,499	64,655	10,456
1942	19,456	403,968	4,865	14,484	1,599	112,921	80,089	447,686	15,521	2,082	31,475	78,164	8,718
1943	36,469	457,757	6,445	18,120	1,450	133,729	92,364	505,294	18,006	1,461	31,562	86,500	8,062
1944	46,453	502,017	5,141	18,137	1,014	157,733	94,223	534,688	19,653	1,352	32,102	87,727	7,052
1945	46,600	502,442	4,914	16,663	1,543	145,959	81,714	542,789	21,874	4,587	31,829	105,023	9,210
1946	45,177	487,904	6,728	17,166	1,094	165,725	70,396	525,178	20,879	7,225	30,713	119,262	5,084
†1947	*50,440*	*544,950*	*8,259*	*16,679*	*666*	*202,177*	*80,040*	*573,151*	*25,479*	*39,987*	*32,549*	*142,566*	*4,776*
‡1947	50,630	560,510	8,392	17,023	877	209,321	96,459	581,398	18,812	40,037	34,282	142,740	4,600
1948	53,946	570,954	8,967	14,062	553	245,189	70,095	686,061	14,981	59,899	36,551	194,749	4,705
1949	47,788	550,903	8,490	12,391	334	294,078	51,851	732,845	14,753	68,062	35,291	204,961	3,693
*1950	§	§	§	§	§	§	§	§	§	§	§	§	§
‖Total	754,158	9,793,089	96,514	261,811	562,902	3,225,365	1,293,575	9,564,892	225,231	290,222	523,970	1,462,467	417,292

YEAR	Ohio	Oklahoma	Pennsylvania	Texas	West Virginia	Wyoming	Others	Total United States	VALUE AT WELLS		VALUE AT POINTS OF CONSUMPTION	
									Total (Thousands of Dollars)	Average Per M Cubic Ft. (Cts.)	Total (Thousands of Dollars)	Average Per M Cubic Ft. (Cts.)
*Pre–1906	305,593	2,215	1,611,066	815	387,799	506	43,281	**961,781**	.....	....	426,448	14.4
1906	45,436	3,520	138,161	*1,000	119,400	*100	59	**388,843**	.....	....	46,874	12.1
1907	52,041	4,867	135,516	*1,200	122,687	*140	149	**406,622**	.....	....	54,222	13.3
1908	47,442	11,925	130,476	*1,500	112,181	*180	200	**402,141**	.....	....	54,640	13.6
1909	53,223	28,037	127,697	*3,000	166,435	*220	82	**480,706**	.....	....	63,207	13.1
1910	48,232	50,430	126,867	*4,000	190,706	*253	110	**509,155**	.....	....	70,756	13.9
1911	49,450	67,276	108,869	5,503	206,891	*265	90	**512,993**	.....	....	74,622	14.5
1912	56,210	73,799	112,150	7,470	239,007	*247	109	**562,203**	.....	....	84,564	15.0
1913	50,612	75,018	118,860	12,160	245,454	*273	90	**581,898**	.....	....	87,847	15.1
1914	68,270	78,167	110,745	13,434	236,489	*306	80	**591,867**	.....	....	94,116	15.9
1915	79,510	87,517	113,692	13,324	244,004	*321	118	**628,579**	.....	....	101,312	16.1
1916	69,888	123,517	130,484	15,810	299,319	*557	149	**753,170**	.....	....	120,227	16.0
1917	68,917	137,384	133,397	17,047	308,617	*1,209	102	**795,110**	.....	....	142,089	17.9
1918	61,261	124,317	123,813	13,440	265,161	4,339	1,926	**721,001**	.....	....	153,554	21.3
1919	63,153	163,649	113,489	24,710	234,095	6,014	118	**745,916**	.....	....	160,888	21.6
1920	58,938	154,467	125,787	37,063	239,719	10,312	42	**798,210**	.....	....	196,194	24.6
1921	47,412	124,058	86,144	44,504	174,921	15,608	27	**662,052**	.....	....	174,617	26.4
1922	51,481	140,631	101,276	47,945	195,288	23,427	22	**762,546**	84,873	11.1	221,535	29.1
1923	53,812	203,082	112,562	74,535	203,867	35,523	151	**1,006,976**	100,849	10.0	240,001	23.8
1924	47,396	214,452	105,863	107,247	182,285	46,036	148	**1,141,521**	105,779	9.3	253,856	22.2
1925	43,235	249,285	101,632	134,872	180,345	45,539	76	**1,188,571**	112,047	9.4	265,271	22.3
1926	47,363	286,421	107,089	175,392	180,223	46,567	61	**1,313,019**	124,693	9.5	300,168	22.9
1927	51,381	326,864	105,709	254,063	162,375	43,582	1,056	**1,445,428**	127,468	8.8	317,930	22.0
1928	56,341	320,861	99,466	301,990	163,018	47,490	1,595	**1,568,139**	139,898	8.9	363,726	23.2
1929	57,936	357,893	101,951	464,928	167,333	44,648	1,169	**1,917,693**	157,596	8.2	413,276	21.6
1930	63,394	348,116	88,706	517,880	144,180	43,219	1,704	**1,943,421**	147,048	7.6	416,090	21.4
1931	56,326	263,685	74,797	464,580	124,797	39,770	1,790	**1,686,436**	117,505	7.0	392,816	23.3
1932	51,466	255,487	61,611	456,832	100,540	28,938	1,148	**1,555,990**	98,985	6.4	384,632	24.7
1933	47,929	245,759	63,579	475,691	100,653	25,830	909	**1,555,474**	97,096	6.2	368,540	23.7
1934	50,330	254,457	86,238	602,976	109,161	23,148	858	**1,770,721**	106,438	6.0	395,378	22.3
1935	49,592	274,313	94,464	642,366	115,772	26,643	853	**1,916,595**	110,402	5.8	429,374	22.4
1936	46,994	280,481	110,362	734,561	138,076	29,322	725	**2,167,802**	119,193	5.5	476,813	22.0
1937	42,783	296,260	115,928	854,561	149,084	31,023	2,980	**2,407,620**	123,457	5.1	528,354	21.9
1938	35,257	263,164	76,547	882,473	134,342	26,678	5,850	**2,295,562**	113,571	4.9	500,698	21.8
1939	36,469	250,875	93,882	979,427	159,226	26,614	5,609	**2,476,756**	120,243	4.9	534,240	21.6
1940	40,639	257,626	90,725	1,063,538	188,751	27,346	5,568	**2,660,222**	120,493	4.5	577,939	21.7
1941	41,858	234,054	92,819	1,086,312	207,681	29,284	5,929	**2,812,658**	138,508	4.9	621,333	22.1
1942	45,055	269,704	93,532	1,170,345	215,193	33,124	5,494	**3,053,475**	154,236	5.1	692,737	22.7
1943	52,001	285,045	93,543	1,323,885	223,787	34,351	4,858	**3,414,689**	176,893	5.2	760,950	22.3
1944	51,724	310,888	92,987	1,525,515	181,452	34,521	6,660	**3,711,039**	189,809	5.1	794,271	21.5
1945	49,967	357,530	82,188	1,711,401	160,225	35,282	6,946	**3,918,686**	191,006	4.9	834,195	21.4
1946	61,570	380,938	92,443	1,776,148	178,958	33,266	4,751	**4,030,605**	212,251	5.3	882,356	22.0
†1947	*73,989*	*393,216*	*94,252*	*1,932,857*	*182,072*	*40,083*	*6,505*	*4,444,693*	*256,682*	*6.0*	*1,031,169*	*23.2*
‡1947	68,946	419,010	91,971	1,992,704	192,233	45,550	6,678	**4,582,173**	274,709	6 0	1,028,318	23.2
1948	65,619	480,573	87,578	2,289,923	203,681	52,424	7,510	**5,148,020**	333,173	6.5	1,193,559	24.1
1949	46,512	435,262	84,739	2,588,921	181,176	50,815	6,871	**5,419,736**	341,443	6.3	1,320,671	25.4
*1950	§	§	§	§	§	§	§	**5,975,000**	364,475	6.1	1,523,625	25.5
‖Total	2,638,964	9,572,879	6,151,400	24,916,991	8,436,587	1,050,810	134,701	87,348,820	§	§	19,138,829	21.9

* Estimate. † Old basis, as in prior years; excludes gas stored and lost in Transmission; not included below in totals. ‡ New basis, as in subsequent years; includes gas stored and lost in Transmission; included below in totals. § Not available. ‖ State totals only through 1949; U.S. total through 1950, with 1947 on new and not old basis.

For HEAVY DUTY pumping at low cost... compare the PELTON "L-P" long stroke JACK to lift MORE FLUID... at LESS COST!

SPHERICAL BALANCE TANK

To permit skid construction, ample air capacity for even loading and low overall height.

INTERCHANGEABLE ROTORS

Pump body will take three sizes of pump rotors, providing the proper speed range for each particular installation.

PELTON PUMP BODY

Designed specifically for this application using triple screw positive displacement rotors to provide rugged and efficient operation.

NO LUBRICATION

All pump bearings are internal, and are continually running in a clean oil bath.

AUTOMATIC COOLING SYSTEM

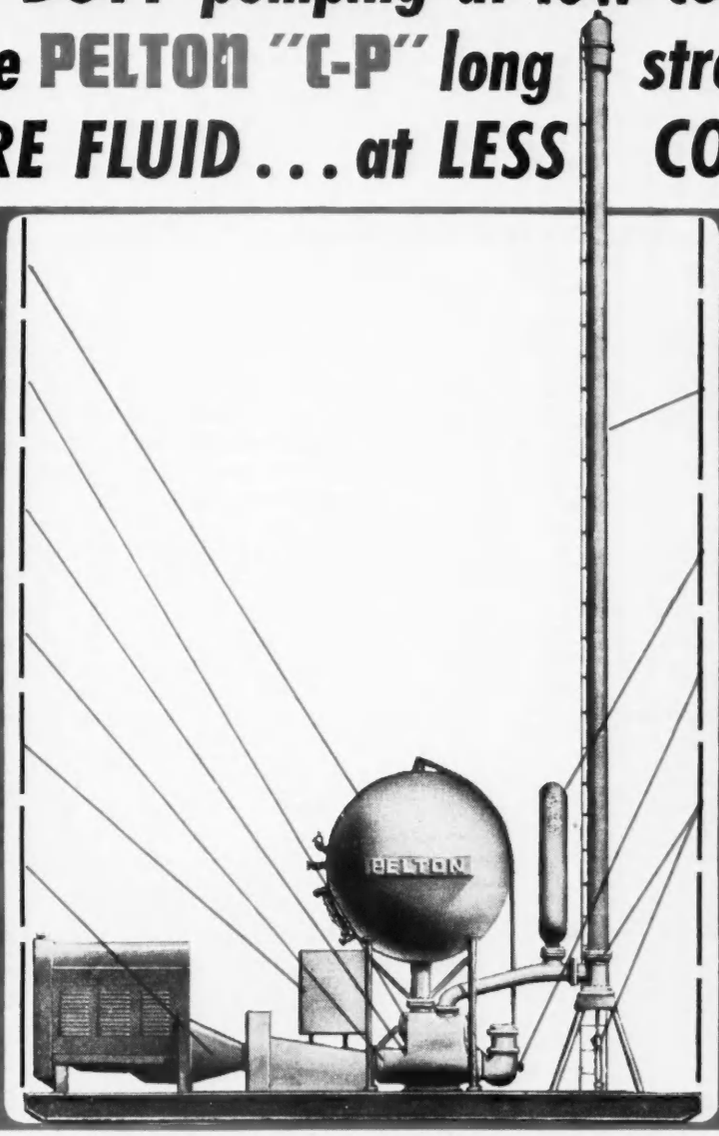
External supply of cooling water is unnecessary with an automatically regulated cooler.

DIRECT DRIVE—AMPLE SPM

Ample pump capacity provides the desired SPM (up to 350 FT/min Polished Rod Velocity) without using a speed increaser.

UNITIZED SKID MOUNTING

Only one connection, the gas line to the engine, is broken to move the unit on or off a well, making it unnecessary to break the hydraulic or pneumatic circuit for pulling operations.



TWELVE MONTH GUARANTEE

Indicating the field proven reliability of Pelton pumping equipment.

30' SURFACE STROKE— 40,000 LB. PRL

Interchangeable cylinders make possible 20', 25' or 30' surface strokes with a polished rod load rating up to 40,000 lbs. Stroke length may be varied during operation with a hand operated valve.

SUCKER ROD STRESS CONTROL

The accumulator maintains an even load on the rod string, thus reducing both the peak sucker rod stress and the load range.

PISTON TYPE SCAVENGER PUMP

A two-stage slow speed combination scavenger pump-air compressor provides long life and eliminates air locking.

PUMP SPACING ADJUSTMENT

Designed with ample clearance to insert 1' sub rods. Hand operated valve provides pump spacing adjustment during operation.

SAFETY FEATURES

Unit automatically shuts down in case of a rod part, stuck bottom hole pump, etc.

AUTOMATIC COUNTERBALANCE AND OIL LEVEL REGULATORS

The counterbalance pressure and the operating fluid is automatically maintained at the correct level.

THE PELTON LONG STROKE

Fewer rod reversals per minute are required to obtain the desired production, resulting in longer rod and pump life. The stroke loss due to rod and tubing stretch is reduced and the bottom hole pump efficiency is increased which in turn aids in handling gassy or sandy fluids as well as increasing the production rate.

THE PELTON HYDRAULIC DESIGN

Sucker rod life is further increased with soft controlled rod reversals, a constant polished rod velocity over the greater portion of the surface stroke, and the use of the stress control accumulator.

THE PELTON MECHANICAL DESIGN

Extra capacity is provided to lift all the fluid desired with high mechanical efficiencies. Rugged construction provides long life with a minimum of surface maintenance. Simplified controls make for easy operation. Interchangeable parts insure quick servicing.

THE PELTON SERVICE

Service engineers are available 24 hours per day wherever Pelton equipment is pumping.

THE COMPLETE PELTON LINE

Pelton Jacks are available with polished rod load ratings of 20,000 lbs., 26,500 lbs., 30,000 lbs., 31,500 lbs., 35,000 lbs. and 40,000 lbs. with surface stroke lengths of 18 ft., 20 ft., 25 ft., and 30 ft. Complete information will be furnished upon request.

PELTON *Long Stroke* **HYDRAULIC PUMPING JACK**

BLW THE BALDWIN GROUP

A SUBSIDIARY OF THE BALDWIN LOCOMOTIVE WORKS

THE PELTON WATER WHEEL COMPANY

2929 NINETEENTH STREET • SAN FRANCISCO 10, CALIFORNIA
2447 EAST 54TH STREET • LOS ANGELES 11, CALIFORNIA

NATURAL GASOLINE

Increase Largest on Record

PRODUCTION of natural gasoline and allied products in the U. S. again set a record in 1950, totaling 180,922,000 barrels for the year and falling short of the half-million mark in daily output by only 4333 barrels. The daily average of 495,677 barrels was an increase of 15.8 percent over 1949's previous high mark. The gain in production was made possible by the extensive program of new plant construction and expansion under way throughout the year.

The growth in natural gasoline production has been phenomenal. The increase last year was 67,724 barrels per day more than in 1949. Although output has risen sharply the past ten years, this is the sharpest annual increase on record. Output in 1950 was two times that of 1943, and 50 percent greater than in 1947.

Not until the mid-point of 1951 is the full effect of the present development program expected to be felt, with an estimated daily output for 1951 of 539,726 barrels being forecast for an estimated total of 197 million barrels for the year. This figure shows a percentagewise increase of only 8.9 over 1950's output, or a daily increase of 44,049 barrels.

Texas, with a production of 255,700 barrels daily, leads other states in production, showing for a 20.9 percent rise over its 1949 figures. Production from Texas, rated at 49.4 percent of the nation's total output during 1949, rose to the point where the state is

Production of Natural Gasoline and Allied Products, By States, By Years (Part 1)

(Natural Gasoline, Cycle Products, and Liquefied Petroleum Gases)

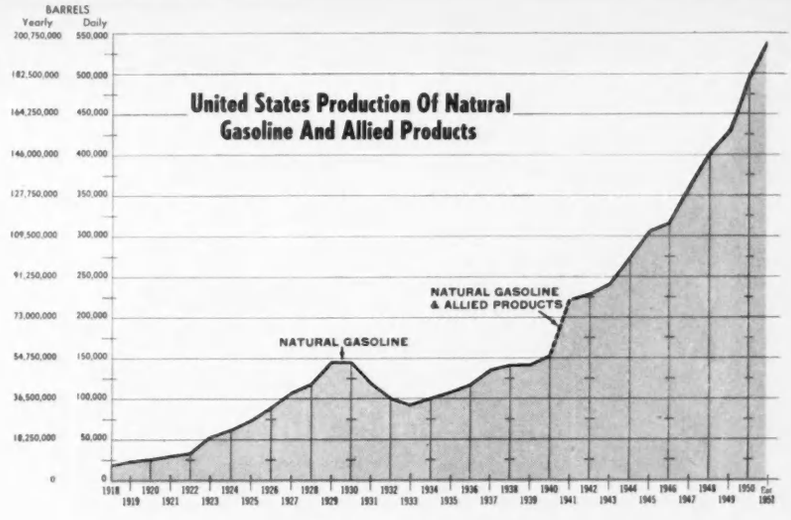
(THOUSANDS OF GALLONS)

YEAR	Arkansas	California	Colorado	Illinois	Kansas	Kentucky	Louisiana	Michigan	Mississippi	Montana	New Mexico
Natural Gasoline:											
1911	.....	50	.....	*145	.....	.....	.....	.....	.....	.....	.....
1912	.....	1,041	.....	*290	.....	.....	.....	.....	.....	.....	.....
1913	.....	3,461	.....	*581	*2	.....	.....	.....	.....	.....	.....
1914	.....	7,581	.....	1,164	*8	.....	.....	.....	.....	.....	.....
1915	.....	12,835	.....	1,035	*40	.....	210	.....	.....	.....	.....
1916	.....	17,159	.....	2,260	215	725	2,113	.....	.....	.....	.....
1917	.....	28,818	.....	4,934	1,175	3,818	4,980	.....	.....	.....	.....
1918	.....	32,269	2	4,575	2,390	3,331	7,021	.....	.....	.....	.....
1919	.....	40,386	.....	6,060	3,284	5,136	10,063	.....	.....	.....	.....
1920	.....	48,208	.....	6,055	4,331	4,497	10,610	.....	.....	.....	.....
1921	.....	58,220	.....	7,536	3,587	4,242	15,341	.....	.....	.....	.....
1922	4,289	67,120	.....	7,700	2,856	5,205	29,406	.....	.....	.....	.....
1923	16,183	173,329	.....	7,356	8,775	7,601	40,720	.....	.....	.....	.....
1924	17,533	232,579	.....	9,091	11,658	7,274	48,098	.....	.....	.....	.....
1925	19,686	303,180	35	9,874	19,592	7,685	43,489	.....	.....	.....	.....
1926	30,385	389,366	276	9,987	25,369	7,689	43,557	.....	.....	.....	1,488
1927	37,498	498,020	912	8,853	36,095	7,480	44,844	.....	.....	.....	1,827
1928	32,677	584,111	1,909	7,817	36,765	7,267	55,022	.....	.....	.....	1,506
1929	33,455	840,325	1,630	7,080	36,227	6,006	64,957	.....	.....	.....	1,077
1930	30,637	829,713	1,322	6,867	35,106	6,641	73,693	.....	.....	.....	3,663
1931	26,282	680,399	659	5,024	32,690	5,464	58,034	.....	.....	.....	17,775
1932	18,653	551,897	472	4,558	24,792	4,877	46,199	.....	.....	.....	17,507
1933	15,215	496,293	408	3,673	24,869	4,514	36,973	188	.....	1,295	19,149
1934	13,033	506,272	643	3,810	27,891	4,171	40,558	589	.....	1,237	21,748
1935	13,076	534,624	417	2,642	32,507	5,614	49,732	1,850	.....	1,739	19,563
1936	11,957	593,416	451	2,337	37,775	6,009	72,687	2,015	.....	2,071	28,921
1937	11,285	623,894	404	2,567	57,026	7,344	106,415	2,408	.....	2,296	38,253
1938	25,648	660,890	386	2,436	55,988	7,040	95,634	3,581	.....	1,768	49,596
1939	24,634	607,237	390	4,012	62,175	7,785	94,090	2,971	.....	2,161	54,707
1940	32,096	587,476	380	21,499	64,691	9,539	113,741	3,919	.....	2,603	55,713
1941	28,108	577,127	390	54,872	72,876	10,247	201,049	5,670	.....	2,517	69,115
Cumulative	442,330	10,587,236	11,086	216,750	720,755	157,201	1,409,236	23,191	.....	17,687	401,608
Nat. Gasln. & Allied Prods.											
1941	34,389	659,765	390	93,165	85,691	35,371	225,724	5,670	.....	3,966	81,000
1942	42,677	633,326	346	139,323	81,828	36,682	296,074	2,518	.....	4,517	89,164
1943	56,837	693,332	†	185,487	85,206	43,317	306,062	1,226	.....	4,664	81,005
1944	75,536	771,280	†	194,369	69,834	48,742	492,659	8,500	.....	4,768	81,161
1945	85,941	891,753	†	175,992	72,637	46,879	549,234	13,630	.....	4,726	97,800
1946	84,507	910,538	840	161,560	82,591	53,862	566,796	12,337	.....	4,597	103,642
1947	94,066	1,064,108	997	162,504	99,195	59,713	628,845	4,287	19,942	5,756	113,051
1948	94,855	1,115,064	1,406	148,627	107,563	65,762	709,838	2,583	47,177	8,447	130,338
1949	95,472	1,137,461	†	136,536	112,295	68,536	763,898	3,229	50,295	9,724	168,722
1950	99,104	1,186,796	†	130,160	148,203	73,567	850,565	3,526	54,072	9,946	215,155
1949 Thous. Gal. Daily	262	3,116	.....	374	307	188	2,093	9	138	27	462
1950 Thous. Gal. Daily	271	3,251	.....	357	406	202	2,330	10	148	27	589
1949 Thous. Bbls.	2,273	27,082	.....	3,251	2,674	1,632	18,188	77	1,197	232	4,017
1950 Thous. Bbls.	2,360	28,257	.....	3,099	3,529	1,752	20,251	84	1,287	237	5,123
1949 Thous. Bbl. Daily	6.2	74.2	.....	8.9	7.3	4.5	49.8	0.2	3.3	0.6	11.0
1950 Thous. Bbl. Daily	6.5	77.4	.....	8.5	9.7	4.8	55.5	0.2	3.5	0.7	14.0

* Estimate. † Wyoming includes drip gasoline in Colorado in 1943, 1944, and 1945, and in Colorado and Utah in 1948, 1949, and 1950.

now producing more than half the natural gasoline and allied products in the U. S., totaling 51.6 percent of the national output for the year. The state is expected to maintain this rate through 1951.

California, up 3200 barrels a day from its 1949 figure, produced 77,400 barrels per day to maintain its hold on second place. Louisiana, up 5700 barrels a day, remained in third place, followed by Oklahoma, with 40,100 barrels per day. Oklahoma's gain over 1949 amounted to 5500 barrels per day, for a percentage increase of 15.9 as compared with only 11.4 for Louisiana. Thus, on a percent basis, Oklahoma showed the second largest increase over the previous year, being second only to the Texas figure of 20.9.



(All Figures in Barrels)

YEAR	Annual Production	Daily Average	YEAR	Annual Production	Daily Average	YEAR	Annual Production	Daily Average
1918	6,727,000	18,430	1931	43,617,000	119,499	(*)Natural Gasoline and Allied Prod.		
1919	8,370,000	22,931	1932	36,281,000	99,128	1941	80,855,000	221,521
1920	9,161,000	25,029	1933	33,810,000	92,630	1942	83,222,000	228,279
1921	10,713,000	29,350	1934	36,556,000	100,154	1943	87,716,000	240,318
1922	12,044,000	32,997	1935	39,333,000	107,762	1944	100,046,000	273,350
1923	19,434,000	53,244	1936	42,770,000	116,858	1945	112,004,000	306,861
1924	22,235,000	60,751	1937	49,177,000	134,732	1946	115,739,000	317,093
1925	26,845,000	73,547	1938	51,347,000	140,677	1947	132,173,000	362,118
1926	32,455,000	88,917	1939	51,650,000	141,507	1948	146,721,000	400,877
1927	39,075,000	107,054	1940	55,700,000	152,186	1949	156,203,000	427,953
1928	43,191,000	118,009				1950	180,922,000	495,677
1929	53,183,000	145,707				1951 Est	197,000,000	539,726
1930	52,631,000	144,194						

* Bureau began a new series covering 1941 and subsequent year, which includes cycle condensate.

Production of Natural Gasoline and Allied Products, By States, By Years, (Part 2)

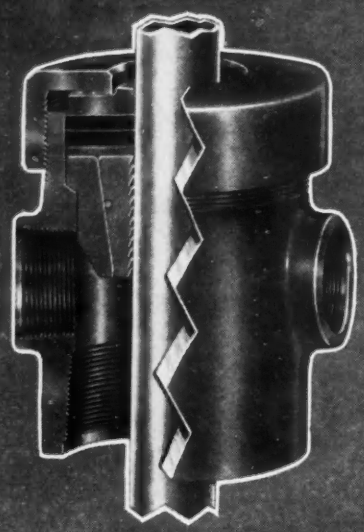
(Natural Gasoline, Cycle Products, and Liquefied Petroleum Gases)

(THOUSANDS OF GALLONS)

YEAR	New York	Ohio	Oklahoma	Pennsylvania	Texas	Utah	West Virginia	Wyoming	Others	Total	VALUE AT PLANT $ Thous.	VALUE AT PLANT ¢ Gal.
Natural Gasoline:												
1911	.....	1,679	388	1,467	.....	.....	3,660	.....	37	7,426	$ 532	7.2
1912	.....	1,719	1,575	2,041	.....	.....	5,318	.....	97	12,081	1,157	9.6
1913	.....	2,073	6,463	3,680	.....	.....	7,662	.....	139	24,061	2,458	10.2
1914	.....	2,440	17,278	4,612	.....	.....	9,278	.....	292	42,653	3,106	7.3
1915	.....	2,199	31,666	5,899	*130	.....	10,854	.....	497	65,365	5,151	7.9
1916	249	2,639	48,360	9,715	1,293	.....	18,765	.....	.....	103,493	14,331	13.8
1917	181	5,440	115,123	13,826	6,920	.....	32,669	.....	.....	217,884	40,189	18.4
1918	218	6,745	163,701	15,775	7,326	.....	37,604	1,579	.....	282,536	50,364	17.8
1919	458	8,801	189,995	20,284	93,387	.....	52,150	5,581	.....	351,535	64,197	18.3
1920	411	10,016	178,857	21,151	32,956	.....	58,941	8,711	.....	384,744	71,788	18.7
1921	366	9,100	185,341	19,856	77,141	.....	54,646	14,558	.....	449,934	61,815	13.7
1922	506	8,600	189,404	18,518	95,405	.....	56,796	19,967	.....	505,832	72,711	14.4
1923	408	10,035	270,249	19,132	177,765	.....	63,381	21,292	.....	816,226	77,268	9.5
1924	477	9,443	301,062	19,254	186,571	.....	61,549	29,272	.....	933,861	82,233	8.8
1925	414	8,701	390,861	18,850	214,092	.....	58,201	32,777	33	1,127,470	120,383	10.7
1926	539	10,817	475,716	20,343	243,093	.....	63,807	40,625	33	1,363,090	136,412	10.0
1927	449	12,167	548,109	16,744	320,723	.....	64,192	43,212	19	1,641,144	118,688	7.2
1928	392	13,174	619,691	16,571	324,516	.....	69,729	42,861	26	1,814,034	138,944	7.7
1929	264	11,166	676,030	18,411	419,485	.....	72,944	44,544	37	2,233,688	158,410	7.1
1930	208	8,937	591,194	16,713	491,299	.....	63,328	51,132	41	2,210,494	128,160	5.8
1931	132	5,199	454,886	14,339	426,695	.....	52,844	51,523	33	1,831,918	63,732	3.5
1932	117	5,163	378,584	11,685	371,106	.....	43,773	44,391	26	1,523,800	49,244	3.2
1933	96	4,662	360,488	11,686	366,515	.....	39,848	34,103	25	1,420,000	54,368	3.8
1934	85	5,881	355,438	10,781	466,570	.....	41,854	34,799	.....	1,535 360	60,523	3.9
1935	27	6,232	379,913	12,623	516,748	.....	42,433	32,246	.....	1,651,986	70,940	4.3
1936	22	6,991	418,591	14,267	520,547	.....	44,389	33,894	.....	1,796,340	84,572	4.7
1937	33	7,704	492,290	13,940	615,281	.....	50,379	33,915	.....	2,065,434	97,125	4.7
1938	27	7,382	468,499	10,734	685,920	.....	50,398	30,647	.....	2,156,574	87,266	4.0
1939	34	7,445	436,123	11,756	770,047	.....	52,272	31,461	.....	2,169,300	90,050	4.2
1940	17	8,062	399,369	15,371	932,040	.....	58,782	34,102	.....	2,339,400	68,261	2.9
1941	17	8,217	362,247	15,440	1,180,221	.....	65.873	34,728	.....	2,688,714	105,815	3.9
Cumulative	6,147	218,829	9,507,491	425,464	9,459,742	.....	1,408,369	751,920	1,335	35,766,377	$2,180,193	6.1
Nat. Gasln. & Allied Prods.												
1941	17	8,217	453,383	16,011	1,558,819	.....	98.044	36,288	.....	3,395.910	119,120	3.5
1942	15	6,975	445,115	15,294	1,567,830	.....	101,828	36.012	.....	3,499,524	121,565	3.5
1943	12	6,495	422,313	17,534	1,646,031	.....	97,942	†36,609	.....	3,684,072	146,910	4.0
1944	12	7,282	421,768	17,495	1,870,419	.....	88,917	†49,190	.....	4,201,932	183,500	4.3
1945	8	6,452	416,184	14,181	2,188,305	.....	87,609	†52,842	.....	4,704,173	187,564	4.0
1946	9	6,253	414,991	11,003	2,282,979	.....	120,444	43,506	.....	4,861,033	180,281	3.7
1947	11	7,084	446,493	13,013	2,639,434	685	141,273	50,810	.....	5,551,267	287,000	5.2
1948	13	6,298	469,478	12,238	3,028,852	576	152,753	60,419	.....	6,162,287	468,334	7.6
1949	9	5,270	529,939	10,264	3,240,014	†	162,788	†66,094	.....	6,560,546	387,072	5.9
1950	1	4,336	614,900	9,807	3,919,926	†	199,121	79,951	.....	7,598,716	426,063	5.6
1949 Thous. Gal. Daily	.....	14	1,452	28	8,877	.....	446	181	.....	17,974	1,060	5.9
1950 Thous. Gal. Daily	.....	12	1,685	27	10,740	.....	545	218	.....	20,818	1,167	5.6
1949 Thous. Bbls.	.....	125	12,618	244	77,143	.....	3,876	1,574	.....	156,203	.....	....
1950 Thous. Bbls.	.....	103	14,640	233	93,332	.....	4,741	1,894	.....	180,922	.....	....
1949 Thous. Bbl. Daily	.....	0.4	34.6	0.7	211.4	.....	10.6	4.3	.....	428.0	.....	....
1950 Thous. Bbl. Daily	.....	0.3	40.1	0.6	255.7	.....	13.0	5.2	.....	495.7	.....	....

* Estimate. † Wyoming includes drip gasoline in Colorado in 1943, 1944, and 1945, and in Colorado and Utah in 1948, 1949, and 1950.

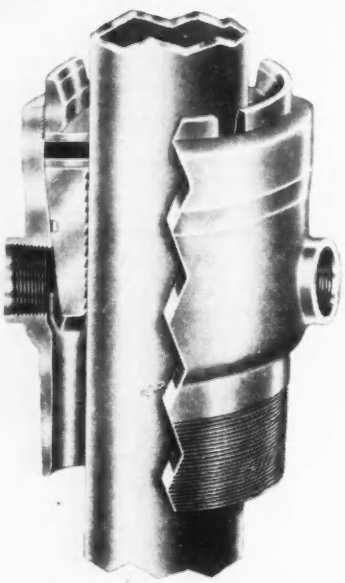
WHERE THERE'S OIL ACTIVITY . .



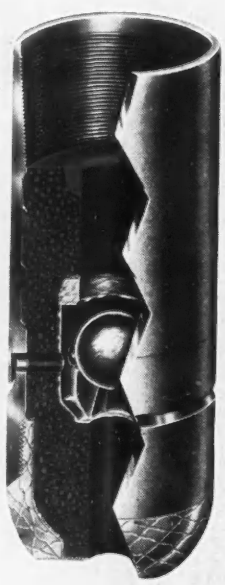
LOW PRESSURE TUBING HEADS

CENTRALIZERS

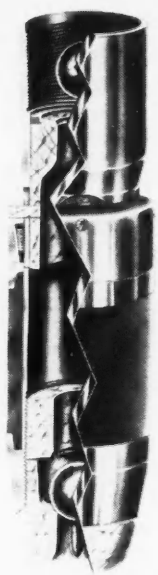
BULL PLUGS & NIPPLES



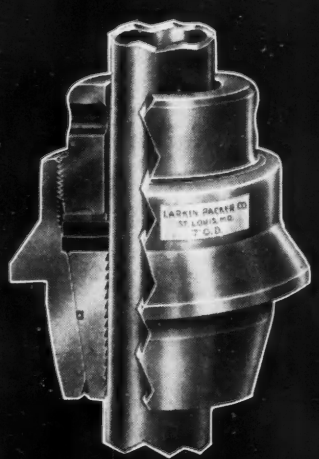
EDIUM PRESSURE CASING HEADS



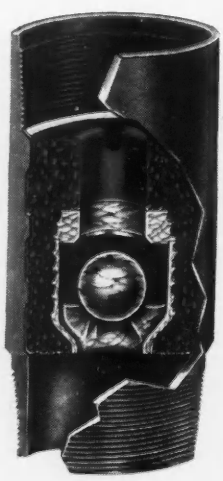
GEYSER SHOES



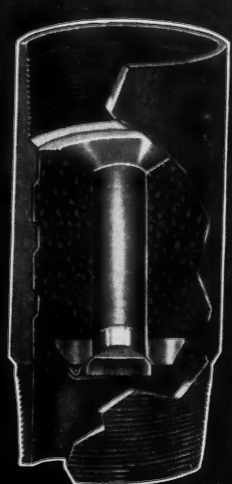
CEMENTROL



TUBING HANGERS



FLOAT COLLARS



FLAPPER TYPE FLOAT COLLAR

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Petroleum Reserves Pass

Estimated Changes in U. S. Reserves of Crude Oil (Only) in 1950, by States

Sources: Reserves beginning of 1950 from American Petroleum Institute; reserves proved in 1950 estimated by WORLD OIL; production in 1950 from Bureau of Mines except November and December from API.

(THOUSANDS OF BARRELS)

STATE	Estimated Proved Reserves Beginning 1950	CHANGES DURING YEAR (Addition) Reserves Proved During 1950	CHANGES DURING YEAR (Deduction) *Production During 1950	CHANGES DURING YEAR Net Change in Reserves (Increase or Decrease)	Estimated Proved Reserves at End of 1950	Ratio of Year-End Reserves to Year's Production (Year's Supply)
Alabama	3,547	2,560	728	+ 1,832	5,379	7.4
Arkansas	297,463	37,200	29,610	+ 7,590	305,053	10.3
California	3,822,751	259,800	326,771	— 66,971	3,755,780	11.5
Colorado	344,812	2,850	23,499	— 20,649	324,163	13.8
Illinois	468,138	103,680	62,447	+ 41,233	509,371	8.2
Indiana	50,209	11,886	10,154	+ 1,732	51,941	5.1
Kansas	738,390	171,090	107,851	+ 63,239	801,629	7.4
Kentucky	56,168	18,095	10,348	+ 7,747	63,915	6.2
Louisiana	1,909,769	230,300	200,487	+ 29,813	1,939,582	9.7
Michigan	66,496	12,320	15,930	— 3,610	62,886	3.9
Mississippi	402,860	33,750	37,015	— 3,265	399,595	10.8
Montana	112,393	7,850	8,139	— 289	112,104	13.8
Nebraska	1,624	3,900	1,423	+ 2,477	4,101	2.9
New Mexico	592,222	71,820	47,675	+ 24,145	616,367	12.9
New York	62,900	.....	4,322	— 4,322	58,578	13.6
Ohio	27,703	2,864	3,350	— 486	27,217	8.1
Oklahoma	1,329,918	362,135	164,722	+ 197,413	1,527,331	9.3
Pennsylvania	103,356	.....	11,710	— 11,710	91,646	7.8
Texas	13,509,732	2,148,400	816,204	+1,332,196	14,841,928	18.2
Utah	15,831	800	1,192	— 392	15,439	13.0
West Virginia	37,992	4,110	2,798	+ 1,312	39,304	14.0
Wyoming	691,602	29,410	59,851	— 30,441	661,161	11.0
*Miscellaneous	3,613	200	559	— 359	3,254	5.8
Total U. S.	24,649,489	3,515,020	1,946,785	+1,568,235	26,217,724	13.5

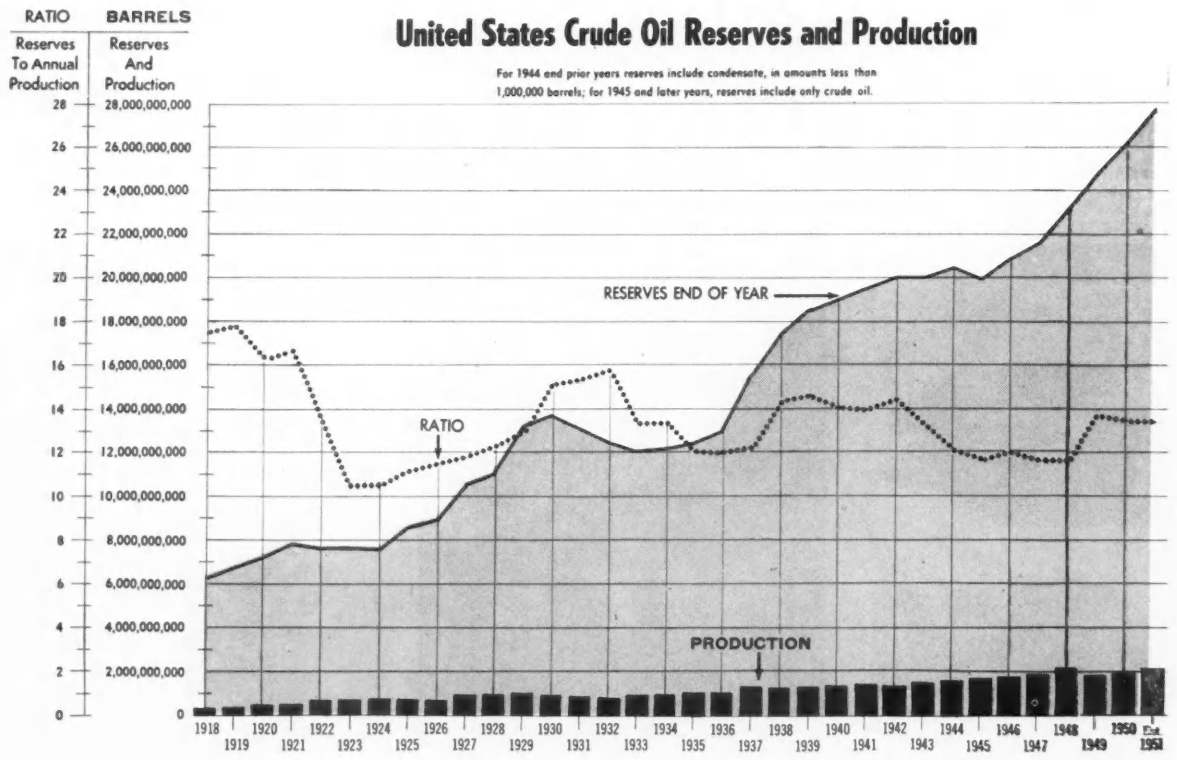
* Missouri, Florida, Tennessee, Virginia.

PROVEN reserves of crude oil and other liquid hydrocarbons in the U. S. were at a new all-time peak of 30,142,790,000 barrels at the end of 1950, it was indicated by WORLD OIL estimates of changes involved for the year. A near-record addition of new oil, gas and distillate, was more than sufficient to offset the amount produced during the year.

Estimated new reserves of 3,940,020,000 barrels proved up by 1950 drilling was 1,764,289,000 barrels more than the 2,175,731,000 barrels produced during the year. A total of 28,378,501,000 had been reported for the end of 1949 by The American Petroleum Institute and American Gas Association.

The large net addition to reserves in 1950 was equivalent to 13.8 years of production at the rate prevailing during the past year, which further relieves the relatively tight situation of wartime and early postwar years.

U. S. reserves of crude oil only are



30 Billion Mark

estimated at a new peak of 26,217,724,000 barrels at the end of 1950. New reserves of 3,515,020,000 barrels estimated as proved up in 1950 compared with the draft of 1,946,785,000 barrels, providing a net increase of 1,568,235,000 barrels. Estimated crude reserves at the end of 1950 were equivalent to 13.5 years of production at the 1950 annual rate.

Texas, the leader, had an estimated 14,841,928,000 barrels of crude reserves at the end of 1950 and there were three others over the billion mark. They were California with 3,755,780,000, Louisiana with 1,939,582,000, and Oklahoma with 1,527,331,000. California was the only one of the four that failed to register a net gain in reserves during 1950. It dropped back 66,971,000 barrels, due to a production of 326,771,000 barrels while new reserves proved during the year amounted only to 259,800,000.

U. S. reserves of natural gas liquids at the end of 1950 are estimated at 3,925,063,000 barrels, based on 425 million proven during the year and 228,949,000 produced, a net addition of 196,051,000 to the 3,729,012,000 barrels of reserves at the end of 1949 as reported by The API and AGA. These reserves include condensate, natural gasoline, and liquefied petroleum gases.

Estimated natural gas liquid reserves at the end of 1950 were equivalent to 17.1 years of production at the rate for that year. These reserves at the end of 1949 were 18.8 times annual production and at the end of 1948 were 19.3 times annual production.

The results in 1950 in proving up 3,940,020,000 barrels of new oil reserves (3,515,020,000 crude and 425 million natural gas liquids) compared with 3,574,000,000 of new reserves for 1949 and 4,265,764,000 for the record-breaking year 1948. Only other year in history which closely approached the 1948 record was 1937, when 3,721,532,000 barrels of crude oil and condensate reserves were proven up.

(See Table on Page 160)

Estimated Proved Reserves of Crude Oil, Natural Gas Liquids, and Total Liquid Hydrocarbons in the U. S., by States
(THOUSANDS OF BARRELS)

	Proved Reserves as of Dec. 31, 1948	Changes in Proved Reserves Due to Extensions (New Crude Oil) and Revisions During 1949	[1]Proved Reserves Discovered in New Fields and in New Pools in Old Fields in 1949	[2]Production During 1949	Proved Reserves as of Dec. 31, 1949 (Columns 1 + 2 + 3 Less Column 4)	Changes in Reserves During 1949 (Column 5 Less Column 1)
	(1)	(2)	(3)	(4)	(5)	(6)
Crude Oil						
Alabama	3,547	448	.....	448	3,547	.....
Arkansas	300,042	23,130	2,412	28,121	297,463	(—) 2,579
California	3,763,583	225,915	166,195	332,942	3,822,751	59,168
Colorado	365,458	2,719	50	23,415	344,812	(—) 20,646
Illinois	393,365	126,909	11,816	63,952	468,138	74,773
Indiana	49,079	2,747	7,865	9,472	50,209	1,130
Kansas	674,395	136,379	27,755	100,139	738,390	63,995
Kentucky	59,209	2,875	3,540	9,456	56,168	(—) 3,041
Louisiana	1,869,290	179,699	43,695	182,915	1,909,769	40,479
Michigan	69,383	9,443	4,217	16,547	66,496	(—) 2,887
Mississippi	365,446	71,034	2,114	35,734	402,860	37,414
Montana	118,944	2,827	272	9,650	112,393	(—) 6,551
Nebraska	865	400	650	291	1,624	759
New Mexico	552,231	46,204	41,266	47,479	592,222	39,991
New York	67,116	.....	.....	4,216	62,900	(—) 4,216
Ohio	28,542	2,646	.....	3,485	27,703	(—) 839
Oklahoma	1,250,401	197,240	33,056	150,779	1,329,918	79,517
Pennsylvania	109,806	5,000	.....	11,450	103,356	(—) 6,450
Texas	12,484,218	1,229,877	531,984	736,347	13,509,732	1,025,514
[3]Utah	807	15,050	600	626	15,831	15,024
West Virginia	36,697	3,000	1,125	2,830	37,992	1,295
Wyoming	715,787	11,934	11,815	47,934	691,602	(—) 24,185
[3]Miscellaneous	2,233	1,952	.....	572	3,613	1,380
Total United States	23,280,444	[4]2,297,428	890,417	1,818,800	24,649,489	1,369,045
[5]Natural Gas Liquids						
[6]Alabama	.....	.....	.....	.....	.....	.....
Arkansas	57,457	1,149	128	3,092	55,642	(—) 1,815
California	307,908	29,996	9,560	27,189	320,275	12,367
Colorado	36,299	(—) 5,307	25	6,827	24,190	(—) 12,109
Illinois	24,162	6,238	81	3,815	26,666	2,504
Indiana	108	29	20	31	126	18
Kansas	102,344	6,573	113	2,625	106,405	4,061
Kentucky	14,401	315	157	1,628	13,245	(—) 1,156
Louisiana	524,096	81,174	17,821	26,669	596,422	72,326
Michigan	1,066	238	18	119	1,203	137
Mississippi	57,564	1,440	101	2,698	56,407	(—) 1,157
Montana	4,000	(—) 80	20	230	3,710	(—) 290
New Mexico	80,247	9,152	736	4,416	85,719	5,472
[6]New York	.....	.....	.....	.....	.....	.....
Ohio	1,664	119	13	126	1,670	6
Oklahoma	200,388	43,062	7,952	17,372	234,030	33,642
Pennsylvania	2,645	158	79	239	2,643	(—) 2
Texas	2,074,674	110,442	54,794	96,199	2,143,711	69,037
[7]Utah	209	7	2	10	208	(—) 1
West Virginia	15,214	1,107	369	3,859	12,831	(—) 2,383
Wyoming	36,307	8,416	540	1,400	43,863	7,556
[7]Miscellaneous	30	(—) 17	36	3	46	16
Total United States	3,540,783	294,211	92,565	198,547	3,729,012	188,229
[8]Total Liquid Hydrocarbons						
[9]Alabama	3,547	448	.....	448	3,547	.....
Arkansas	357,499	24,279	2,540	31,213	353,105	(—) 4,394
California	4,071,491	255,911	175,755	360,131	4,143,026	71,535
Colorado	401,757	(—) 2,588	75	30,242	369,002	(—) 32,755
Illinois	417,527	133,147	11,897	67,767	494,804	77,277
Indiana	49,187	2,776	7,785	9,503	50,335	1,148
Kansas	776,739	142,952	27,868	102,764	844,795	68,056
Kentucky	73,610	3,190	3,697	11,084	69,413	(—) 4,197
Louisiana	2,393,386	260,873	61,516	209,584	2,506,191	112,805
Michigan	70,449	9,681	4,235	16,666	67,699	(—) 2,750
Mississippi	423,010	72,474	2,215	38,432	459,267	36,257
Montana	122,944	2,747	292	9,880	116,103	(—) 6,841
Nebraska	865	400	650	291	1,624	759
New Mexico	632,478	55,356	42,002	51,895	677,941	45,463
[9]New York	67,116	.....	.....	4,216	62,900	(—) 4,216
Ohio	30,206	2,765	13	3,611	29,373	(—) 833
Oklahoma	1,450,789	240,302	41,008	168,151	1,563,948	113,159
Pennsylvania	112,451	5,158	79	11,689	105,999	(—) 6,452
Texas	14,558,892	1,340,319	586,778	832,546	15,653,443	1,094,551
Utah	1,016	15,057	602	636	16,039	15,023
West Virginia	51,911	4,107	1,494	6,689	50,823	(—) 1,088
Wyoming	752,094	20,350	12,355	49,334	735,465	(—) 16,629
[10]Miscellaneous	2,263	1,935	36	575	3,659	1,396
Total United States	26,821,227	2,591,639	982,982	2,017,347	28,378,501	1,557,274

[1] Only a limited area is assigned to each new discovery, though API and AGA committees may believe that eventually a much larger area will produce; this report only considers actually proved reserves.

[2] The 1949 production figures were compiled by the API and AGA reserves committees and where necessary are based on 11 months actual production with an estimate for December. Any variance between actual production, as later reported, and figures used herein will be compensated for through revisions in following year.

[3] In API report for December 31, 1948, crude reserves under "Miscellaneous," which included Florida, Missouri, Tennessee, Utah, and Virginia, were recorded in Column 5 of crude reserves data as 3,040. In this report, Utah, with 807 of this 3,040, is listed separately, other four states still in "Miscellaneous."

[4] Crude oil reserves extensions and revisions include 1,693,862 thousand bbls. of extensions to old pools and upward revisions of 603,566 thousand bbls. in previous estimates.

[5] Natural gas liquids include condensate, natural gasoline, and liquefied petroleum gases.

[6] Included below in "Miscellaneous."

[7] In API-AGA report for December 31, 1948, the natural gas liquids reserves under "Miscellaneous," which included Alabama, New York, and Utah, were recorded in Column 5 of natural gas liquids data as 239. In this report, Utah, with 209 of this 239, is listed separately, other three states still in "Miscellaneous."

[8] Crude oil and natual gas liquids (condensate, natural gasoline, and liquefied petroleum gases).

[9] Crude oil only; natural gas liquids not separable from miscellaneous grouping above, in natural gas liquids.

[10] Includes Alabama and New York natural gas liquids; Missouri, Tennessee and Virginia crude; and Florida crude and natural gas liquids. Utah included in "Miscellaneous" in previous year, shown separately.

Estimated Proved Reserves of Crude Oil, Natural Gas Liquids, and Total Liquid Hydrocarbons in the United States, by Years

(Sources: Crude oil by American Petroleum Institute; natural gas liquids and total liquid hydrocarbons by API and American Gas Association. Reserves at end of 1936 and for subsequent years estimated by committees on reserves; earlier data estimated by API department of statistics but not based on geological surveys. Data for latest year estimated by WORLD OIL.)

(THOUSANDS OF BARRELS)

YEAR	Estimated Proved Reserves Beginning of Year	CHANGES IN RESERVES DURING YEAR							Estimated Proved Reserves at End of Year (Col. 1 + Col. 8)	Ratio of Year-End Reserves to Year's Prod. (Year's Supply) (Col. 9 ÷ Col. 7)
		(ADDITION) RESERVES PROVED DURING YEAR					(Deduction) *Production During Year	(Net Change) Increase or Decrease (Col. 6 — Col. 7)		
		Revisions of Previous Estimates	Extensions to Old Pools	Total Revisions and Extensions (Cols. 2+3)	New Pools Discovered During Year	Total Reserves Proved During Year (Cols. 4+5)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Crude Oil (Incl. Cycle Plant and Lease Condensate)										
1857-1899	0					†3,439,984	†939,984	††2,500,000	2,500,000	‡43.8
1900	2,500,000					463,621	63,621	+ 400,000	2,900,000	45.6
1901	2,900,000					169,389	69,389	+ 100,000	3,000,000	43.2
1902	3,000,000					288,767	88,767	+ 200,000	3,200,000	36.0
1903	3,200,000					300,461	100,461	+ 200,000	3,400,000	33.8
1904	3,400,000					317,081	117,081	+ 200,000	3,600,000	30.7
1905	3,600,000					334,717	134,717	+ 200,000	3,800,000	28.2
1906	3,800,000					126,494	126,494		3,800,000	30.0
1907	3,800,000					266,095	166,095	+ 100,000	3,900,000	23.5
1908	3,900,000					278,527	178,527	+ 100,000	4,000,000	22.4
1909	4,000,000					383,171	183,171	+ 200,000	4,200,000	22.9
1910	4,200,000					509,557	209,557	+ 300,000	4,500,000	21.5
1911	4,500,000					720,449	220,449	+ 500,000	5,000,000	22.7
1912	5,000,000					622,935	222,935	+ 400,000	5,400,000	23.8
1913	5,400,000					348,446	248,446	+ 100,000	5,500,000	22.1
1914	5,500,000					165,763	265,763	— 100,000	5,400,000	19.9
1915	5,400,000					381,104	281,104	+ 100,000	5,500,000	19.6
1916	5,500,000					700,767	300,767	+ 400,000	5,900,000	19.6
1917	5,900,000					335,316	335,316		5,900,000	17.6
1918	5,900,000					655,928	355,928	+ 300,000	6,200,000	17.4
1919	6,200,000					878,367	378,367	+ 500,000	6,700,000	17.7
1920	6,700,000					942,929	442,929	+ 500,000	7,200,000	16.3
1921	7,200,000					1,072,183	472,183	+ 600,000	7,800,000	16.5
1922	7,800,000					357,531	557,531	— 200,000	7,600,000	13.6
1923	7,600,000					732,407	732,407		7,600,000	10.4
1924	7,600,000					613,940	713,940	— 100,000	7,500,000	10.5
1925	7,500,000					1,763,743	763,743	+1,000,000	8,500,000	11.1
1926	8,500,000					1,070,874	770,874	+ 300,000	8,800,000	11.4
1927	8,800,000					2,601,129	901,129	+1,700,000	10,500,000	11.7
1928	10,500,000					1,401,474	901,474	+ 500,000	11,000,000	12.2
1929	11,000,000					3,207,323	1,007,323	+2,200,000	13,200,000	13.1
1930	13,200,000					1,298,011	898,011	+ 400,000	13,600,000	15.1
1931	13,600,000					251,081	851,081	— 600,000	13,000,000	15.3
1932	13,000,000					85,159	785,159	— 700,000	12,300,000	15.7
1933	12,300,000					605,656	905,656	— 300,000	12,000,000	13.3
1934	12,000,000					1,085,065	908,065	+ 177,000	12,177,000	13.4
1935	12,177,000					1,219,596	996,596	+ 233,000	12,400,000	12.4
1936	12,400,000					1,763,087	1,099,687	+ 663,400	13,063,400	11.9
1937	13,063,400			2,792,790	928,742	3,721,532	1,277,664	+2,443,868	15,507,268	12.1
1938	15,507,268			2,243,571	810,493	3,054,064	1,213,186	+1,840,878	17,348,146	14.3
1939	17,348,146			2,058,455	340,667	2,399,122	1,264,256	+1,134,866	18,483,012	14.6
1940	18,483,012			1,607,012	286,338	1,893,350	1,351,847	+ 541,503	19,024,515	14.1
1941	19,024,515			1,538,989	429,974	1,968,963	1,404,182	+ 564,781	19,589,296	13.9
1942	19,589,296			1,618,925	260,051	1,878,976	1,385,479	+ 493,497	20,082,793	14.5
1943	20,082,793			1,202,368	282,418	1,484 786	1,503,427	— 18,641	20,064,152	13.3
1944	20,064,152			1,556,192	511,308	2,067,500	1,678,421	+ 389,079	20,453,231	12.2
1945	20,453,231	*248,891	1,441,424	1,690,315	419,984	2,110,299	1,736,717	+ 373,582	20,826,813	12.0
Crude Oil Only:										
1945	19,784,530					1,870,971	1,713,655	+ 157,316	19,941,846	11.6
1946	19,941,846	+1,254,705	1,158,923	2,413,628	244,434	2,658,062	1,726,348	+ 931,714	20,873,560	12.1
1947	20,873,560	+ 749,278	1,269,862	2,019,140	445,430	2,464,570	1,850,445	+ 614,125	21,487,685	11.6
1948	21,487,685	+1,958,853	1,429,873	3,398,726	396,481	3,795,207	2,002,448	+1,792,759	23,280,444	11.6
1949	23,280,444	+ 603,566	1,693,862	2,297,428	890,417	3,187,845	1,818,800	+1,369,045	24,649,489	13.6
§1950	24,649,489					3,515,020	⧗1,946,785	+1,568,235	26,217,724	13.5
Natural Gas Liquids (Condensate, Natural Gasoline, Liquefied Petroleum Gases):										
1946									3,163,219	
1947	3,163,219			192,237	59,301	251,538	160,782	+ 90,756	3,253,975	20.2
1948	3,253,975			405,874	64,683	470,557	183,749	+ 286,808	3,540,783	19.3
1949	3,540,783			294,211	92,565	386,776	198,547	+ 188,229	3,729,012	18.8
§1950	3,729,012					425,000	*228.949	+ 196,051	3,925,063	17.1
Total Liquid Hydrocarbons:										
1946									24,036 779	
1947	24,036,779			2,211,377	504,731	2,716,108	2,011,227	+ 704,881	24,741,660	12.3
1948	24,741,660			3,804,600	461,164	4,265,764	2,186,197	+2,079,567	26,821,227	12.3
1949	26,821,227			2,591,639	982,982	3,574,621	2,017,347	+1,557,274	28,378,501	14.1
§1950	28,378,501					3,940,020	2,175,734	+1,764,289	30,142,787	13.8

* Production for 1936 and previous years from U. S. Bureau of Mines; production for 1937 and each subsequent year compiled by API (and AGA) committees on basis of 11 months actual and December estimated. Small variance of these figures from actual production as later reported is compensated by revision when reserves report for succeeding year is compiled.

† During years 1857-1899. ‡ Based on production of 57,071 thousand barrels in 1899. § Estimated by WORLD OIL. ⧗ Crude oil only, not including 26,027 lease condensate fed into pipe lines with crude oil. * Includes 180,922 plant production of natural gasoline, etc; 26,027 lease condensate; estimated 22,000 losses and waste.

NEW PRODUCTION METHODS

Help Industry Set Records

By H. E. TREICHLER, JR.
General Superintendent, Houston Oil Company of Texas

THIS IS the second of two articles devoted to new developments in oil field equipment and methods during the past year. It is a resume of new production practices which have further increased efficiencies in oil and gas recoveries. While the discussion to follow does not cover all new things developed in 1950 for producing oil, several significant improvements are briefly described. This article is based on a paper presented at the January 23, 1951 meeting of the Houston Chapter, API, through whose permission it is published.

AN ALL-TIME high in domestic demand for petroleum products was reached in 1950. Production of liquid petroleum and natural gas liquids was in excess of 2 billion barrels for the second time in history.

In a news bulletin released by The American Petroleum Institute, it was estimated that the domestic demand for 1950 was 2,356,000,000 barrels. This is an increase of 11 percent over 1949. It was estimated that 43,000 wells were completed in 1950, and production of domestic crude was approximately 1,973,000,000 barrels. Another record was made in the production and distribution of natural gas. Sales of natural gas for 1950 were about 20 percent above the total sales for 1949. To help in making these records, approximately $100 million was spent by the industry for research work to find new production methods, new uses for petroleum, and to improve known products.

This paper will be limited to a brief discussion of a few of the new developments in production practices in 1950 to assist in making these records. In an attempt to describe these developments in some order, those items concerned with the bottom of the hole will be considered first. The first item worthy of mention is the work that has been done to increase the productivity of low permeability reservoirs. The back log of experience in application of the Hydrafrac process has resulted in a more careful selection of wells for treatment, and the percent of successful jobs has increased. Some success has been reported on the use of the Strata Lift technique which is comparable to Hydrafrac except that a high viscosity acid is used as the fracturing fluid. This acid, like the fluid used in the Hydrafrac process, returns to a very fluid state after a predetermined period of time. In a calcareous formation the acid reacts with the soluble part of the formation after it returns to its fluid state and enlarges the passages made by application of pressure. This same type of acid, in a less viscous state, is being successfully used in the same manner as regular acid in lime formation. The advantage is in the fact that the action of the acid is retarded and the acid is spent away from the wellbore rather than at the wall of the hole. Neither the Strata Lift acid nor the high viscosity can be used to any advantage in hot holes. At temperatures in excess of 125° F., the gel is broken rapidly. Work is being carried on to increase this limiting temperature.

Gravel Packing

The next thing on the list is the improved technique of gravel packing wells. This technique was not exactly new in 1950, but it came into its own. It differs from the old in two respects. Probably the most important factor is the size of the gravel used. Gravel used on the Gulf Coast ranges in size from 20 to 60 thousandths of an inch in diameter. The second, and a very important development, is the discovery that gravel can be squeezed through perforations in casing, thereby making the gravel pack in perforated casing just as successful as in open hole. The third improvement is the realization of the necessity of using clean fluids for replacement of the gravel.

Several new tools have been developed to gravel pack wells, the main object being to save time. A brief description of a gravel packing job will give the best picture of the technique. Open-ended tubing was run to the bottom of the hole. The well was circulated with clear salt water or oil, depending on conditions. Fine gravel was then pumped to the bottom of the hole, one cubic foot at a time, and squeezed through the perforations until it was found by checking the bottom with the tubing that additional gravel cannot be displaced from the hole. A predetermined amount of gravel was then spotted in the bottom of the hole and the tubing was pulled. A small diameter, 2⅜ or 2⅞-inch slotted liner, or screen, was then run in the hole and washed through the gravel to bottom. The liner packer was set and the well completed.

This technique of completion has made it possible to put wells on production that, until the advent of this

About the Author

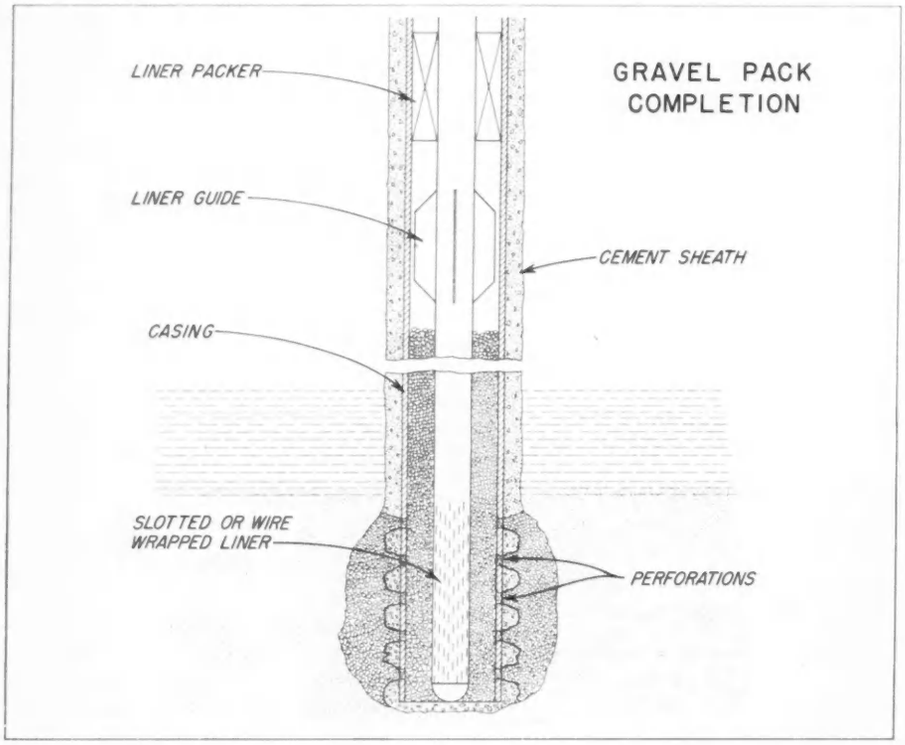
HERB TREICHLER, JR., has been closely associated with petroleum production operations since his graduation in 1940 from Colorado School of Mines, where he received a B.S. degree in petroleum engineering. He immediately joined The Texas Company and spent almost ten years in field work. In June, 1950, he joined Houston Oil Company of Texas as general superintendent, his present position.

procedure, had been impossible to produce.

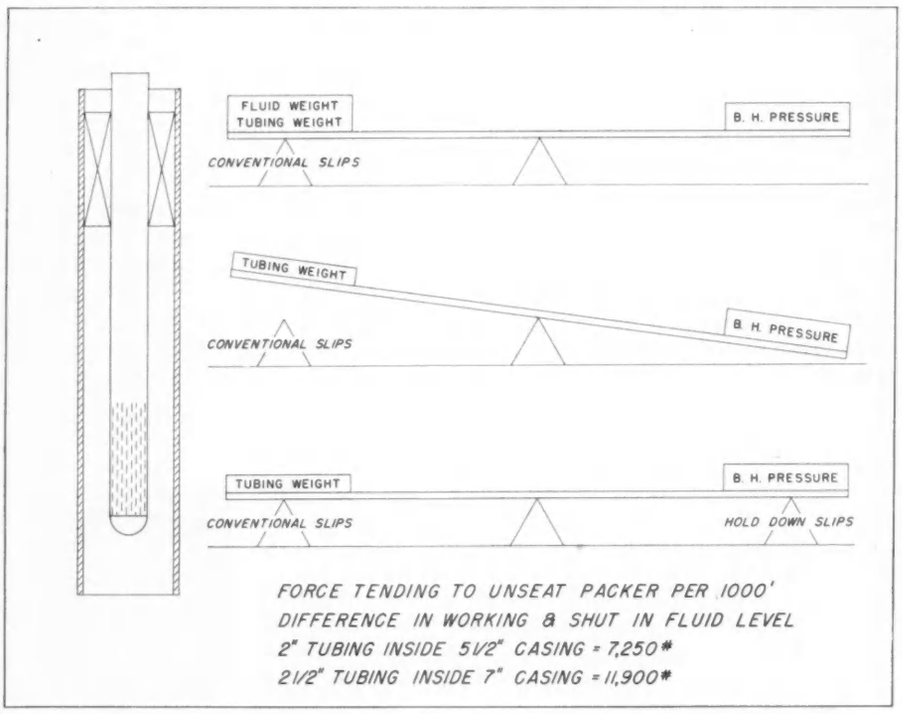
A new application of gravel packing was announced at the fall meeting of the AIME in New Orleans by Thomas S. West, who cited cases in which he has gravel-packed a small liner in open hole with alternate layers of coarse and relatively impermeable material. By using this technique, setting a packer inside the liner and pumping oil into the upper part of the formation and producing from the lower portion, he was able to produce very thin oil columns with no free gas.

Production Packers

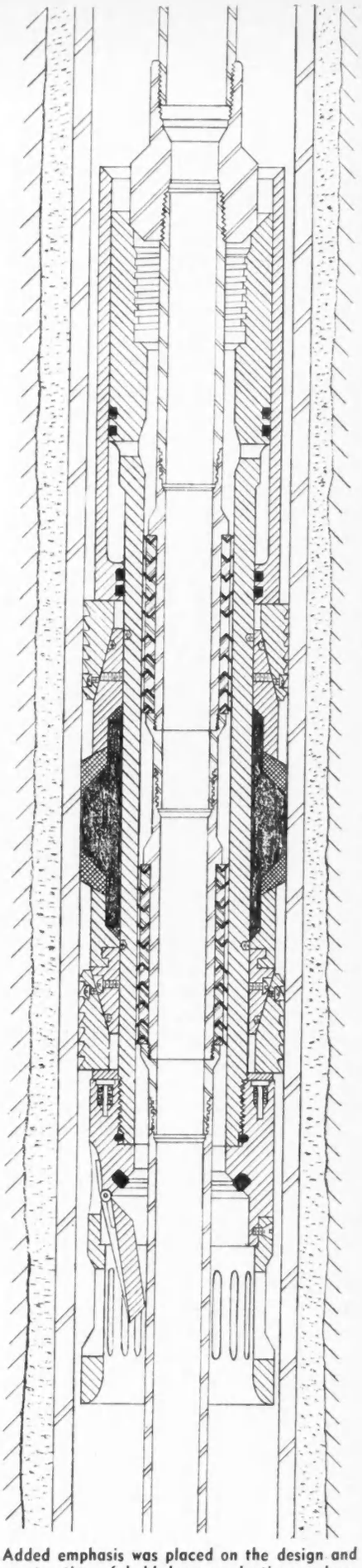
The next development for 1950 has been the more widespread use of hold-



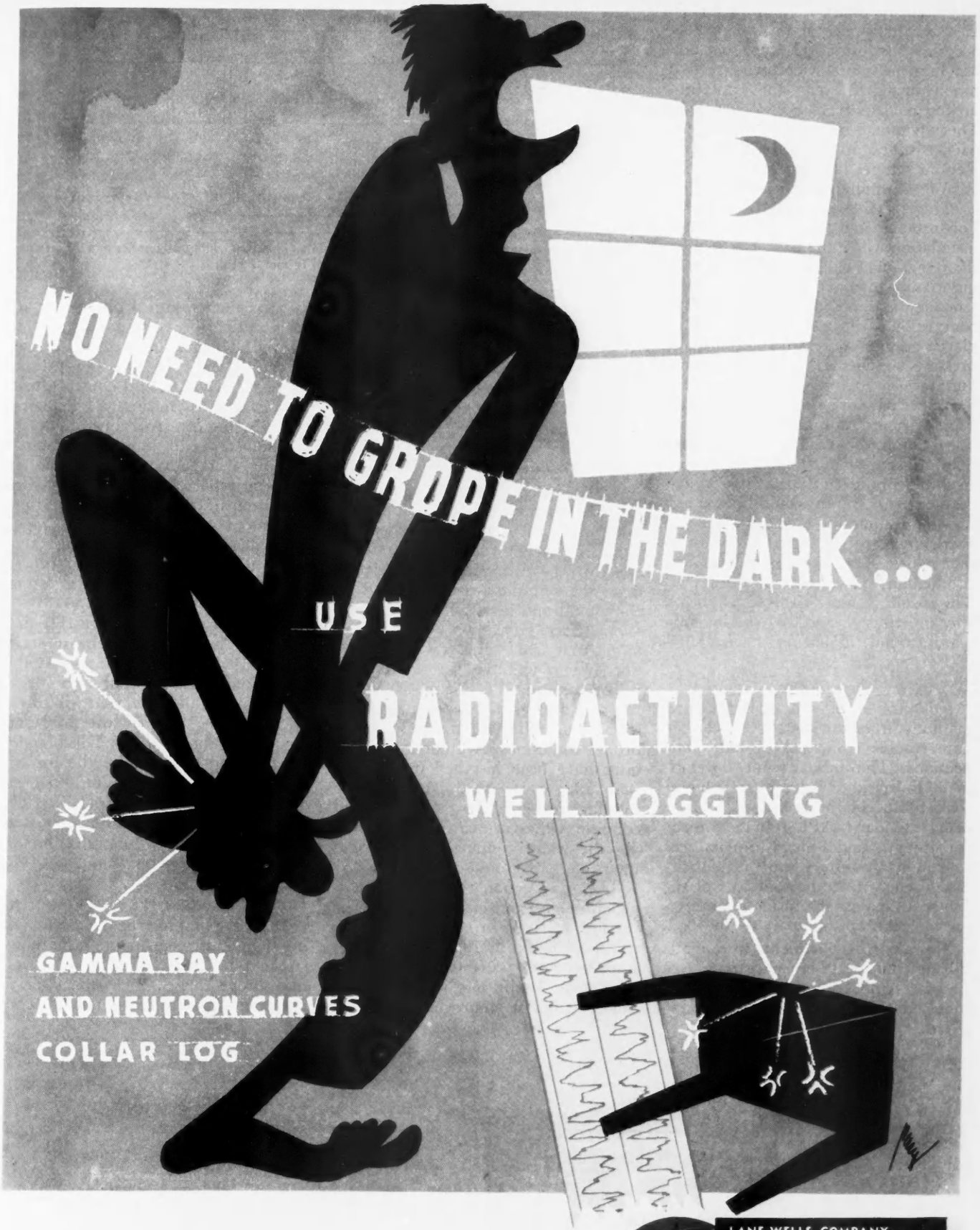
Developments in gravel packing during the year make it possible to squeeze graded gravel through casing perforations. Much was learned also about grain size and placement fluids.



The necessity for using the hold-down type packer received more attention in the past year, and several unique devices were developed along these lines. This diagram shows the basic factor of unbalanced forces that make the hold-down packer necessary.



Added emphasis was placed on the design and construction of hold-down production packers. More consideration was given their use in the field.



Well Surveys, Inc.

TULSA, OKLAHOMA U.S.A.

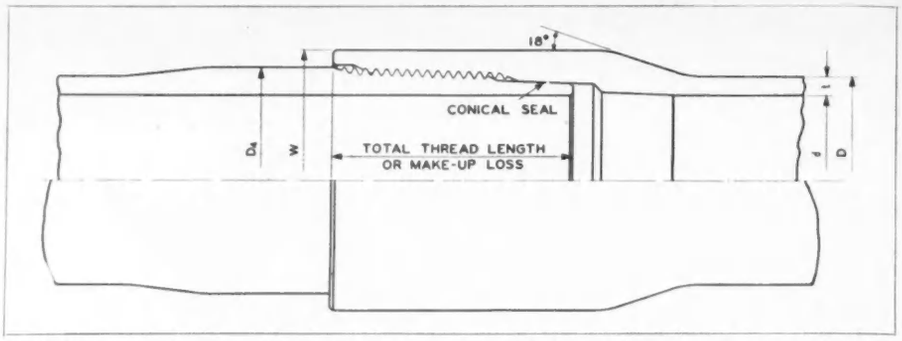
LANE-WELLS COMPANY
UNITED STATES & CANADA
SEISMOGRAPH SERVICE CORP.
of Delaware
MEXICO
GEOTECNICA, S. A.
BUENOS AIRES, ARGENTINA
PETRO-TECH SERVICE CO.
CARACAS, VENEZUELA

down-type production packers. This idea was not new in 1950, but the necessity for using this type of tool has received more widespread recognition during the year, and some improved packers have been developed. The advantage of the holddown-type packer is most apparent for dual completions, on gas lift installations, or in any other installation where the forces working on the packer are variable. For instance, in a hypothetical gas lift installation, when the packer is first set there is an over balance of forces tending to push the packer to bottom. This tendency is opposed by the action of conventional slips. When this well is placed on production, the bottom-hole pressure changes so that the working fluid level is 1000 feet below the static fluid level. If for some reason the gas supply should fail and the pressure released on the casing, the bottom-hole pressure would tend to build up to static conditions and a force in excess of 7000 pounds would be everted upward and tend to unseat the packer. Evidence of this action is quite often seen when sand is found above the production packer in the annulus. This sand is most likely to find its way into this position by passing upward around the packing element.

Tubing Joints

A lot of work was done by pipe manufacturers during 1950 to eliminate trouble from leaky tubing connections. The most recent development to my knowledge is an integral joint tubing of the box and pin type using standard API tubing threads for strength, and a metal-to-metal seal to retain pressure. The outside circumference of the bottom part of the pin seals against the inside circumference of the bottom part of the box.

No major developments were made during the year on christmas tree design. The major improvements along this line were in streamlining the connections to reduce cost and in improving material to increase strength and resistance to corrosion. A new tubing head has been developed and put into use which allows rotation of the tubing after the well is completed.



A significant development was made in tubing joints. This is an integral joint, using API tubing threads and a metal-to-metal seal.

Separation Equipment, Gas Lift

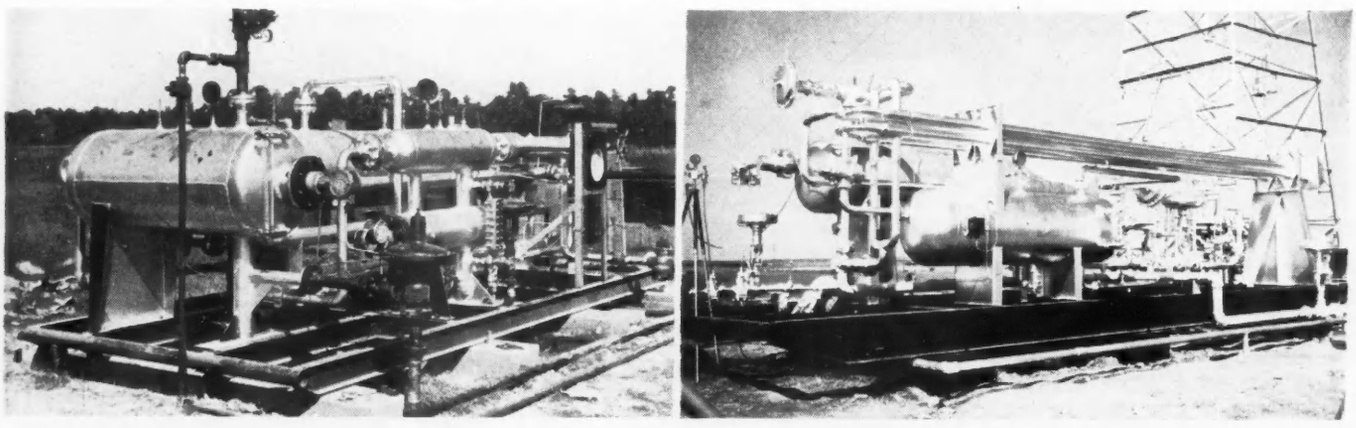
A major step was made in 1950 in the continued development and improvement of low temperature separation. Equipment manufacturers and operators have cooperated to determine the optimum size and kind of equipment and its application for low temperature separation. It has been found that a low temperature separation system will pay out in a short period of time in increased liquid recovery and less trouble from hydrate formation, when installed under proper conditions. A number of these units have been installed in the past year and most are reported to be fulfilling expectations. Under ideal conditions they are capable of reducing the water content of the gas to interstate pipe line specifications.

The production man's thoughts generally go from gas to gas lift. The number of wells being gas lifted was again increased in 1950. Some minor improvements were made in the equipment itself, but it is probable that the major improvement in gas lift efficiency results from closer attention to performance of the individual well. This has been caused by the increasing value of gas. Several refinements in valves and controls have been made. A means of changing valves by use of a wire line, eliminating the necessity of pulling the tubing, is being worked on at this time. It has been reported that several strings have been in operation for some time and one of the gas lift service companies will soon be ready to offer these valves to the industry. If this procedure proves satisfactory, the cost of gas lift should be reduced.

Another gadget in the gas lift line that was in the development stage during 1950 is an adaptation of the old plunger lift. A plunger, or mandrel, has been designed that will travel up the tubing between the fluid and the lifting column of gas. This plunger is calculated to minimize the bypassing of gas through the fluid on deep intermitter type installation. This device has shown some promise on test runs in certain types of wells, but results are not conclusive.

Pumping Units, Tank Batteries

In the pumping field, the major developments were in the large long-stroke type units. This type of unit may prove to be the best answer to deep pumping problems. The units are



Two examples of low-temperature separation units developed during the year. Added emphasis has been placed on extracting maximum values of liquid hydrocarbons and water from gas sold to transmission lines.

hydraulically or pneumatically actuated and are designed to operate the pump plunger through a long stroke at slow speed in an attempt to reduce rod stress to a minimum.

There has been some progress made in tank battery design for both land and water operation. Shell Oil Company has a completely automatic lease in operation in the East Texas field. From all reports the pumper is on duty more as a matter of form than of necessity. The Texas Company in Louisiana is using barge-mounted tank batteries for marsh locations. These batteries are conventional in most respects except that they are mounted on a large barge, the hull of which is also used for storage. The barge rests on bottom when full. Gulf Oil Corporation and The Atlantic Refining Company are using a specially-designed submersible barge equipped with a super-structure on which the tank battery is located. These units are being used in semi-open water.

All devices and techniques developed during 1950 for use in completing and producing individual wells are probably not as important, however, as the more widespread recognition of the fact that increased producing efficiency can best be obtained by proper control of production from oil and gas reservoirs.

This, like most of the equipment mentioned earlier, was not new in 1950, but most of us have a better understanding now than we did a year ago of the terms, retrograde condensation, bubble point, solution gas-oil-ratio, saturation pressure, etc. It has been seen in dollars and cents that cycling of some gas reservoirs is feasible. Benefits of pressure maintenance projects in certain oil reservoirs are being recognized. Secondary recovery projects are becoming more numerous. The benefits of reservoir analysis are definitely showing up. Many authors and speakers have emphasized the point that the benefits to be gained from reservoir analysis are not limited to new fields. Thorough understanding of the reservoir from which he is producing is important in dollars and cents to every operator, large or small, in every field, old or new.

The industry is bending every effort to find more oil, increase recovery efficiency of known oil reserves, and through these efforts will continue to meet the demands of the nation in war or peace for petroleum so long as the incentive of reasonable profit can be expected.

Hamstring High-Pressure Problems

before they occur

"Keyed" Landing Nipples and Locking Assemblies

for Otis Sub-Surface Pressure Controls

Operators sometimes call this Otis down-well equipment "selective" nipples and mandrels because of a "keyed" locating and locking principle that provides a safe and positive method of installing Otis production tools in as many as five different places in the same string of tubing. As high-pressure wells are being completed, or when tubing is rerun after repairs, one or two—or as many as five—corrosion-resistant Type S Otis Landing Nipples can be made up as part of the tubing string. When required later, Otis Removable Bottom-Hole Chokes, Regulators, and Tubing Safety Valves attached to a "selective" locking assembly can be run in (on a wire line, under full shut-in well pressures) and set at the desired depth in the string. Each "keyed" locking device, and the production tool it carries, will pass through all upper landing nipples until the mandrel "selects" its correspondingly-keyed nipple. Contact your nearest Otis engineer for complete details and illustrated technical literature. *Otis Pressure Control, Inc., Box 7206, Dallas; field offices in* Houston, Corpus Christi, Victoria, Falfurrias, Longview, Odessa, Oklahoma City, New Iberia, Houma, Brookhaven, and Caracas, Venez.

Otis—outstanding in the Industry for pressure control

PRODUCING DEPTH RECORDS

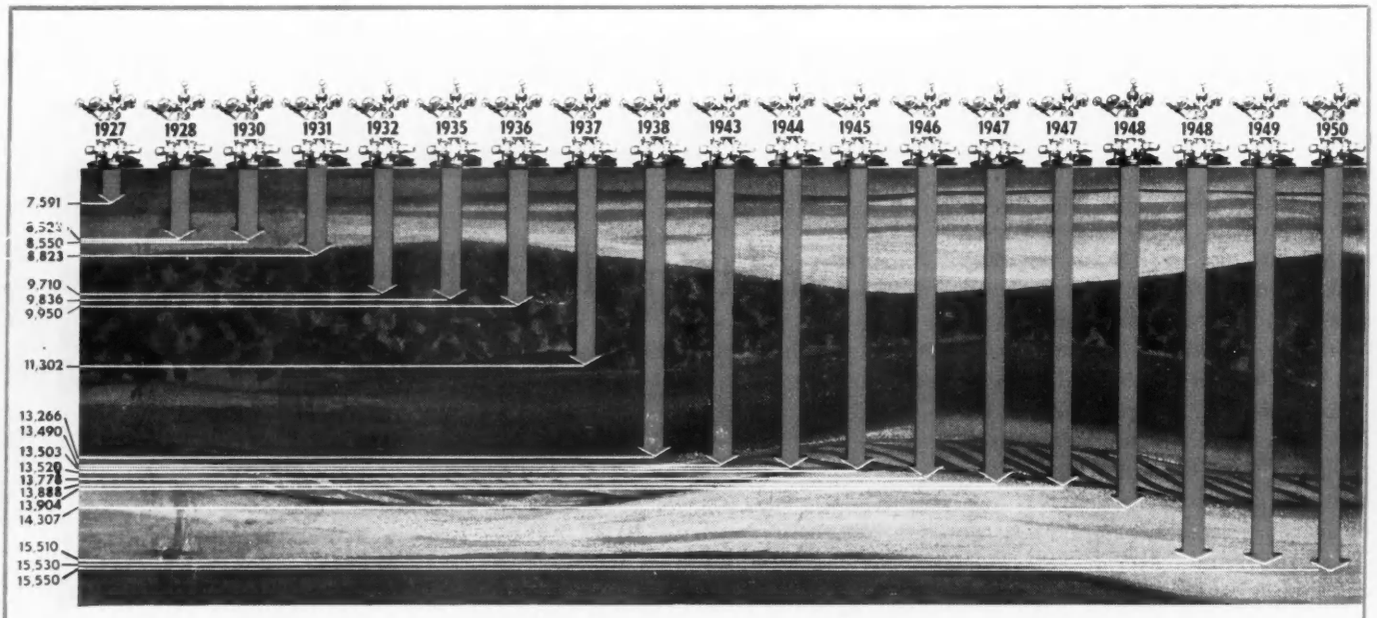
Shattered in Seven Areas

THE string of years in which the industry has bettered its deepest producing depth was extended to eight in 1950, but the new record was just barely in time to be included in that period, for it was almost on the last day of the year that a producer was tested on the West Coast to lower the year-old mark by 20 feet.

The industry's continuing search for deeper oil and gas production resulted in new depth records for six other areas. Two of those were Gulf Coast states whose names and records are always present near the top of any listing of deep producing wells. In both cases, the previous records were set in 1949, and in 1950 Texas and Louisiana did it again.

For the second consecutive year a new deep production record for the nation was set in California, and each time it was accomplished by the same operator and in the same area. Standard Oil Company of California has in 1949 and 1950 drilled the deepest producing wells in the U. S. and the world, but still the deepest is only 40 feet deeper than the old 1948 record-holder drilled in Oklahoma.

The listing of the 1949 and 1950 depth champions looks almost like a typographical error, for both were drilled by Standard of California. Both were located in the Wasco field of Kern County, and both carried the same name only with different numbers. The 1950 record-breaker was the Mushrush 2, while the No. 5 had been its predecessor. The numerical misalignment is explained by the fact that the No. 2 was drilled first origi-



Year	WELL AND LOCATION	Feet
1927	E. J. Miley's Athens 6, Rosecrans field, California	7,591
1928	Texon Oil and Land Company's University 1-B, Big Lake field, West Texas	8,523
1930	Star Petroleum Company's Colby 2, Long Beach, California	8,550
1931	Tide Water Associated Oil Company's Lloyd 57, Ventura Avenue, California	8,823
1932	Tide Water Associated Oil Company's Lloyd 83, Ventura Avenue, California	9,710
1935	Tide Water Associated Oil Company's Lloyd 131, Ventura Avenue, California	9,836
1936	The Texas Company's Lafitte 5, Lafitte field, Southern Louisiana	9,950
1937	Union Oil Company's Kernco 1-34, Rio Bravo field, Kern County, California	11,308
1938	Fohs Oil Company's Buckley-Bourg 1, DeLarge field, Southern Louisiana	13,266
1943	Union Producing Company's Fitzpatrick-Vizard 1, DeLarge field, Southern Louisiana	13,490
1944	Union Producing Company-Fohs Oil Co.'s Buckley-Bourg 2, DeLarge field, Southern Louisiana	13,503
1945	Shell Oil Company's Smith-State 1, Weeks Island field, Southern Louisiana	13,520
1946	Shell Oil Company's Smith-State 2, Weeks Island field, Southern Louisiana	13,778
1947	Shell Oil Company's Smith-State 3, Weeks Island field, Southern Louisiana	13,888
1947	The Texas Company's LaFourche Basin Levee Dist. 1, Queen Bess Island field, Southern Louisiana	13,904
1948	Pure Oil Company's Unit 1, West Poison Spider field, Wyoming	14,307
1948	Denver Producing and Refining Company's School Land 1-A, Cogar field, Caddo County, Oklahoma	15,510
1949	Standard Oil Company of California's Mushrush 5, Wasco field, Kern County, California	15,530
1950	Standard Oil Company of California's Mushrush 2, Wasco field, Kern County, California	15,550

nally, but was deepened in 1950 to its present record depth.

Mushrush 2, producing from an Eocene pay formation at 15,550 feet, bested its sister well, No. 5, by only 20 feet. No. 5 had exceeded Oklahoma's Caddo County gas producer also by 20 feet to take top honors in 1949. That gasser, Denver Producing & Refining Company's School Land 1-A, still ranks third in the nation.

In Louisiana, production was found at 15,148 feet to bring the total wells producing from below 15,000 feet to three. That state had long been the location of deep wells, having held the national producing depth record without a break from 1938 to 1947. Within that period the record had been lowered seven times, but always by a South Louisiana test.

Louisiana's stepup left only one state in the 14,000-foot bracket. That is Wyoming, with its deepest production coming from 14,307 feet in a well that once held the national record.

Texas and Mississippi occupy the 13,000-foot position, with Texas having the deepest of the two. The state's deepest was drilled during 1950 in West Texas and production is from the Ellenburger with bottom at 13,310 feet. Mississippi's record is 13,082 feet and that has stood since 1947.

12,000-Footers

The Upper Coast of Texas and southeastern New Mexico are the only two regions whose deepest output is coming from the 12,000- to 13,000-foot interval. Florida and Southwest Texas are the 11,000-foot areas, and the deepest production in North Louisiana, East Texas, and Lower Texas Coast comes from just below the 10,000-foot level.

There are eight states that have oil, gas, or condensate production from as deep as 10,000 feet. Besides Texas' deepest in the Western district, there are four other districts of the state in which 10,000-foot or deeper production occurs.

The national producing depth record has been pushed steadily deeper during the past decade. The record first dropped below 10,000 feet in 1937, then lowered to 13,266 feet in 1938, but wasn't again disturbed until 1943. From then on, each year has seen a new deeper mark reached.

Indicative of the industry's restlessness in finding new and deeper oil and gas sources is the fact that all except one of the 26 oil or gas states have lowered their producing marks in the past decade. That is Kentucky, whose record was set at 5170 feet in 1938.

The 19 record-holding wells since 1927 have been drilled by 12 operators. Tide Water Associated Oil Company and Shell Oil Company have each held the record three times, while The Texas Company, Union Producing Company, and Standard of California have each held it twice.

Producing Depth Records in U. S., by States and Districts

State or District	Feet*	Year	Formation	Well, Location, and Type of Production
California	15,550	1950	Eocene	Standard Oil Co. of California's Mushrush 2, Wasco field, Kern County, (Oil) World's deepest.
Oklahoma	15,510	1948	Viola	Denver Producing & Refining Company's School Land 1-A, Coga. field, Caddo County. (Gas)
South Louisiana	15,148	1950	Miocene	Shell Oil Company's Weeks Gall Unit 2-2, Weeks Island field, Iberia Parish. (Oil)
Wyoming	14,307	1948	2nd Frontier	Pure Oil Company's Unit 1, West Poison Spider field, Natrona County. (Oil)
West Texas	13,310	1950	Ellenburger	General American Oil Co.'s J. F. Peck 3-E, Sweetie Peck field, Midland County. (Oil)
Mississippi	13,082	1947	Glen Rose	Gulf Refining Company's L. L. Majors 1, West Ovett field, Jones County. (Oil)
Upper Texas Coast	12,670	1950	Frio	Meredith, Clegg and Hunt's Earl C. Hankamer et al Unit 1, Jefferson County. (Condensate)
New Mexico—S.E.	12,600	1949	Devonian	Amerada Petroleum Corporations Hamilton 1, Knowles field, Lea County. (Oil)
Florida	11,588	1948	L. Cretaceous	Humble O&R Co.'s Lee Tidewater Cypress Lumber Co. 1-B, Sunniland field, Collier County. (Oil)
Southwest Texas	11,012	1950	Frio	Union Producing Corporation's V. Tatton 1, Virginia field, Aransas County. (Oil)
North Louisiana	10,864	1949	Smackover "B	Midstates Oil Corp's Lewis-Hearn-Williamson 1, Haynesville Deep field, Clairborne Parish. (Oil)
East Texas	10,312	1942	Pettit	Humble O&R Company's Curtis 1, Larissa field, Cherokee County. (Oil)
Lower Texas Coast	10,132	1946	Wilcox	Continental Oil Company's Clay West Burns 2, Clay West field, Live Oak County. (Oil)
Utah	9,392	1949	Green River	Carter Oil Co.-Standard O&G Co.'s Ute-Tribal 1, Roosevelt field, Uintah County. (Oil)
Arkansas	9,320	1944	Smackover	Tide Water Associated Oil-Seaboard Oil Company's Bendaw 1, Patton field, Lafayette County. (Oil)
Colorado	9,280	1949	Paradox	Delhi Oil Corporation's Barker 3, Barker Creel field, La Plata County. (Gas)
South Central Texas	9,018	1946	Edwards	Quintana Petroleum Corporation's C. Muil 3, Muil field, Atascosa County. (Oil)
Texas Panhandle	8,970	1949	Mississippian	Sinclair Oil & Gas Company's C. S. Lips 1, Lips field, Roberts County. (Oil)
North Texas	8,940	1946	Ellenburger	Standard Oil Co. of Texas I. Beasely 2, Sivels Bend field, Cooke County. (Oil)
New Mexico—N.W.	8,875	1945	Paradox	Southern Union Gas Co.'s Barker-Ute Indian 11, Barker Creek field, San Juan County. (Gas)
West Virginia	8,410	1946	Oriskany	Ohio Oil Company's Kuykendall et al 1, Dry Fork District, Tucker County. (Gas)
Pennsylvania	8,229	1949	Onondaga	Peoples Natural Gas Company's William Piper 1, Unity Twp., Westmoreland County. (Gas)
Montana	7,560	1949	Dakota	British American Oil Prod. Co.'s McClellan-Gov't. 1, Clark's Fork field, Carbon County. (Condensate)
North Central Texas	7,132	1950	Ellenburge.	Sun Oil Company's J. P. Maddox 1, Mary Neal field, Nolan County. (Oil)
Kansas	6,200	1947	Cherokee	Stanolind Oil & Gas Company's Feather 1, Liberal, SE field, Seward County. (Condensate)
Ohio	5,880	1946	Clinton	Frank Lyons' Anita B. Wright 1, Hanover Township, Columbiana County. (Gas)
New York	5,229	1942	Oriskany	E. Kent Kane's Robert Lewis 1, West Union Township, Steuben County. (Gas)
Kentucky	5,170	1932	Devonian	United Carbon Company's Howe 1, Pike County. (Gas)
Michigan	5,160	1949	Richfield	Turner Petroleum Company's Boettcher 1, Cedar field, Osceola County. (Oil)
Nebraska	4,900	1950	Third Dakota	Ohio Oil Company's M. Gurschke 1, Huntsman field, Cheyenne County. (Oil)
Illinois	4,780	1943	Trenton	Kingwood Oil Company's Shanafelt 24-A, Salem field, Marion County. (Oil)
Maryland	4,456	1949	Huntersville	Cumberland & Allegheny Gas Company's Elmer N. Beachy S-424, Garrett County. (Gas)
Alabama	3,624	1945	Eutaw	Hunt Oil Company's Robert Land 4, Gilbertown field, Choctaw County. (Oil)
Indiana	3,011	1946	McClosky	H. E. Ledbetter et al's Noble Utley 1, Springfield Consolidated field, Posey County. (Oil)
Tennessee	1,790	1948	Knox	Turner Bros. & Shaner's Fred Johnson 1, Forbus field, Fentress County. (Oil)
Missouri	1,444	1940	Bartlesville	Cities Service Oil Company's Jim Cook 1, Tarkio field, Atchison County. (Oil)

* Maximum depth from which production comes.

PRODUCING OIL WELLS

Register Gain of 18,472

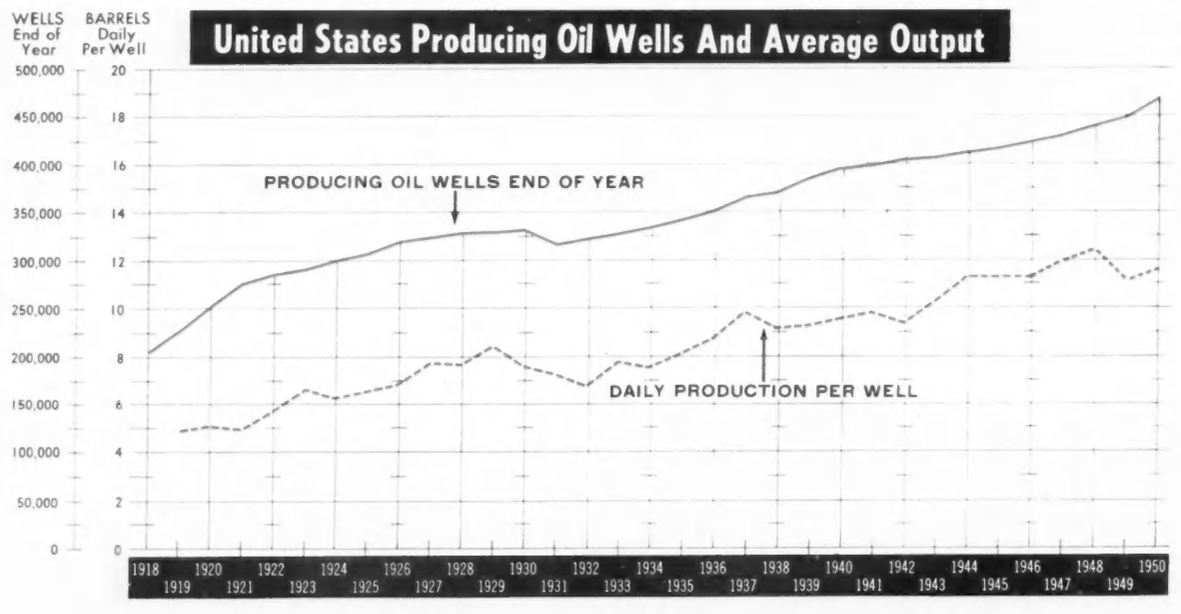
ANOTHER record in the number of producing oil wells gave the U. S. a new all-time top mark of 470,543 oil and condensate wells at the end of busy 1950. This was an increase of 18,775 over the 451,768 oil and condensate producers at the end of 1949.

Reopening of California heavy crude production and a generally stable price structure helped account for the fact that oil wells producing at 1950's end jumped to 467,776, a boost of 18,472 over the 449,304 wells that were producing oil at the end of 1949. Percentagewise, oil wells accounted for 99.41 of the year-end total.

This gain of 18,472 in the number of producing oil wells was the largest the U. S. has registered since 1921, when there was an increase of 23,500.

Another near record lay in the 23,812 new oil wells completed during the year. This was the second best figure of all time, being second only to the 24,278 recorded in 1920.

The daily production per well during 1950 increased in both oil and condensate classifications. The daily output per oil well at 1950's end was 12.1, which was second only to the record year 1948, when the figure was



YEAR	Number of Producing Oil Wells at End of Year	Gain In No. Producing Oil Wells	New Oil Wells Completed in Year	Production Per Well Per Day During Year	YEAR	Number of Producing Oil Wells At End of Year	Gain In No. Producing Oil Wells	New Oil Wells Completed in Year	Production Per Well Per Day During Year	YEAR	Number of Producing Oil Wells At End of Year	Gain In No. Producing Oil Wells	New Oil Wells Completed in Year	Production Per Well Per Day During Year
1918	203,375	.....	17,860	....	1929	328,200	400	15,362	8.4	1940	389,010	8,620	19,843	9.6
1919	227,000	23,625	21,041	4.8	1930	331,070	2,870	11,693	7.5	1941	399,960	10,950	19,590	9.7
1920	251,000	24,000	24,278	5.0	1931	315,850	*15,220	7,011	7.2	1942	404,840	4,880	10,977	9.4
1921	274,500	23,500	14,715	4.9	1932	321,500	5,650	10,530	6.7	1943	407,170	2,330	9,887	10.2
1922	284,880	10,380	17,790	5.7	1933	326,850	5,350	8,070	7.7	1944	412,220	5,050	13,502	11.2
1923	290,100	5,220	16,182	6.6	1934	333,070	6,220	13,119	7.5	1945	415,750	3,530	13,944	11.3
1924	299,100	9,000	14,707	6.2	1935	340,990	7,920	15,418	8.1	1946	421,460	5,710	16,087	11.3
1925	306,100	7,000	17,029	6.5	1936	349,450	8,460	18,704	8.7	1947	426,280	4,820	17,613	12.0
1926	318,600	12,500	18,626	6.8	1937	363,030	13,580	23,115	9.8	1948	437,880	11,600	22,197	12.8
1927	323,300	4,700	14,382	7.7	1938	369,640	6,610	19,106	9.1	1949	449,304	11,424	21,415	11.0
1928	327,800	4,500	12,348	7.6	1939	380,390	10,750	17,734	9.2	1950	467,776	18,472	23,812	12.1

* Only decrease of recent time, reflecting abandonment or shutting in of many wells when early chaotic development of East Texas field, coupled with business depression, severely depressed crude prices.

SOURCE: Producing well data for 1918-1948 from U. S. Bureau of Mines, with more recent years by WORLD OIL with cooperation of state conservation officials and others. Completion data since 1920 from records of WORLD OIL (and predecessor, The Oil Weekly), earlier years from Bureau of Mines. Daily average production per well obtained by dividing daily average production of nation for year by average number of wells producing during year, that is, between January 1 and December 31.

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To obtain maximum pumping efficiency—long, economical service, too—put the Bethlehem "XX" Copper-Bearing Sucker Rod to work in non-corrosive wells.

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BETHLEHEM "XX" COPPER-BEARING SUCKER ROD

Chemical Analysis

	pct		pct
Carbon	.37 to .44	Sulphur	.05 max
Manganese	.70 to 1.00	Silicon	.15 to .30
Phosphorus	.04 max	Copper	.20 min

Mechanical Properties

	average	minimum
Yield Point	60,000 psi	52,000 psi
Tensile Strength	90,000 psi	85,000 psi
Elongation in 2 in.	35 pct	30 pct
Reduction of Area	55 pct	45 pct
Brinell Hardness Number	183	170
Izod Impact	——	45 ft-lb

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BETHLEHEM *Sucker Rods*

now TWO MORE *Completely New*

HD-9

WEIGHT: 18,500 lb.
70 DRAWBAR Hp.
GM 4-71 DIESEL ENGINE
SPEEDS: 6 forward, to 5.68 mph.;
3 reverse, to 4.43

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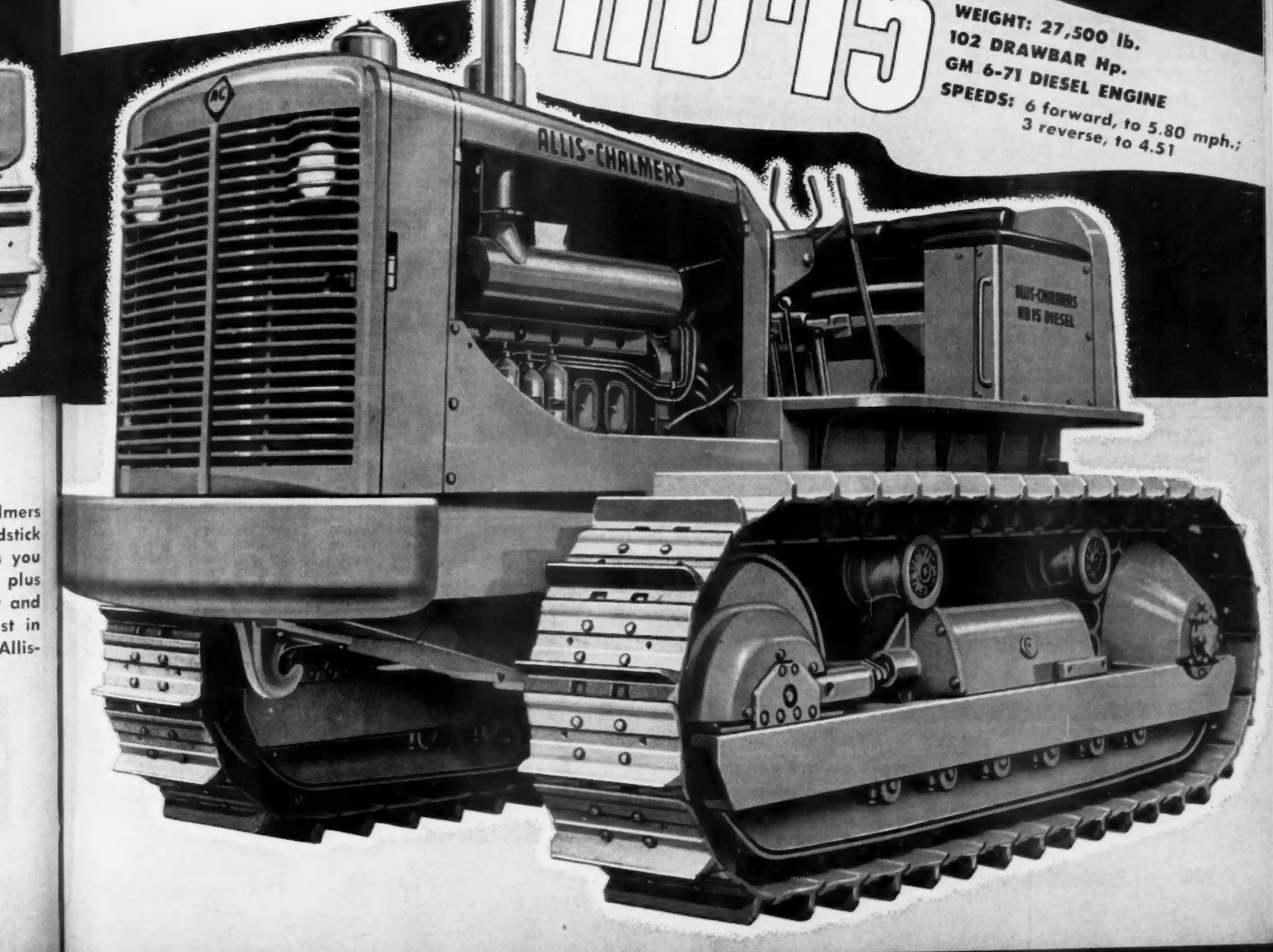
Complete Line of Matched Equipment, Developed in Cooperation With Allied Manufacturers, Available For Both The HD-9 and HD-15.

HD-15

WEIGHT: 27,500 lb.
102 DRAWBAR Hp.
GM 6-71 DIESEL ENGINE
SPEEDS: 6 forward, to 5.80 mph.; 3 reverse, to 4.51



12.8. Daily yield at 1949's end was 11.0.

Condensate wells, which numbered 2767 at 1950's end compared with 2464 for the year previous, had a 27.9 barrels per day yield compared with 24.7 at the end of 1949 and 26.2 at the end of 1948.

Most of the nation's producing oil wells continued to obtain their yield by artificial lift. Of the 467,776 oil wells at the end of 1950, there were 414,189 on artificial lift (pumping or air-gas lift) and only 53,587 were flowing. Thus, of the 18,472 gain in producing oil wells during the year, artificial lift wells accounted for 16,220 of the growth, while flowing wells were responsible only for 2252.

More than one-third of the increase in producing oil wells during the year was accounted for by Texas, which had 122,124 producers at the end of 1950 compared with 115,483 in 1949, which was a gain of 6641. Every Texas area except District 6 (East Texas field) contributed to the state's over-all gain.

California was responsible for 3606 of the nation's increase in producing oil wells. That state had 28,106 oil producers at 1950's end compared with 24,500 at the end of 1949. Most of California's increase can be credited to the San Joaquin Valley, a big producer of heavy oil, which had 2795 more oil wells at the end of 1950 than it had a year previous.

A sizable gain was also made by Oklahoma, which had 56,826 producers at the end of 1950, compared with 54,360 at the end of 1949—an increase of 2466.

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Active Producing Crude Oil and Condensate Wells in U. S., Methods of Producing, and Average output per Well, by States and Districts, at End of 1949 and 1950

Data represent only active crude oil and condensate producing wells, including no inactive or shut-in wells and no gas wells. Compiled by WORLD OIL, with cooperation of state conservation departments and other sources.

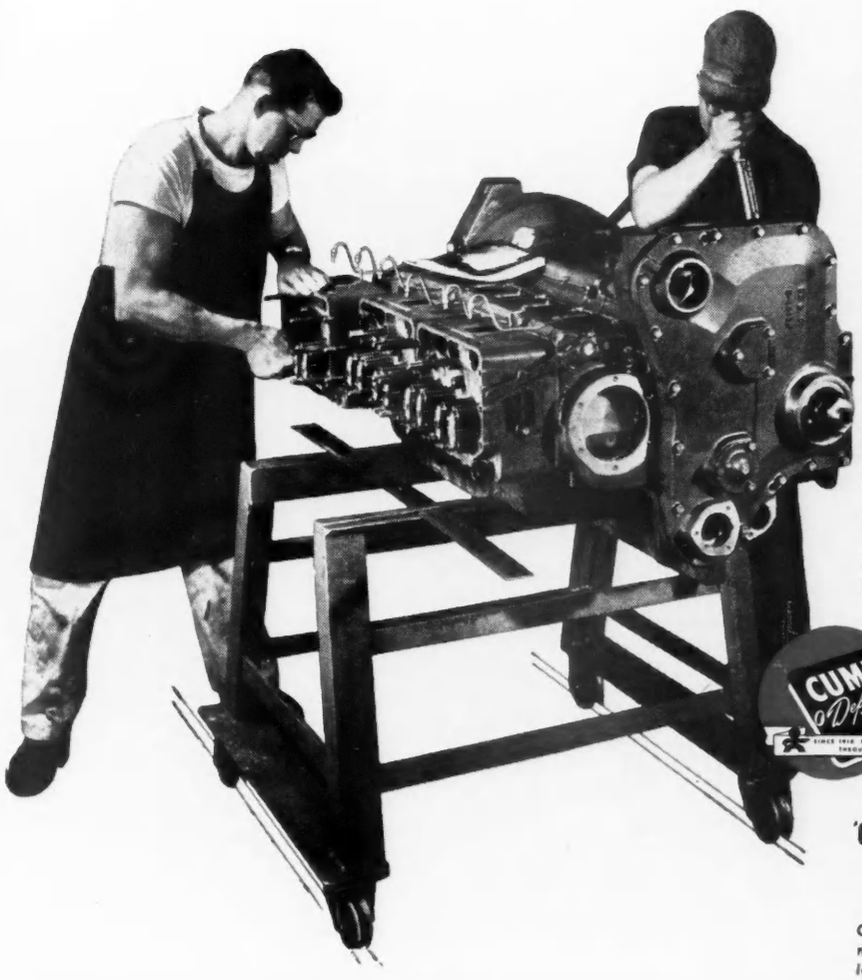
STATE or DISTRICT	CONDENSATE WELLS						CRUDE OIL WELLS										TOTAL CRUDE OIL AND CONDENSATE WELLS			
	End of 1949			End of 1950			Flowing		Artificial Lift		TOTAL CRUDE OIL WELLS						End of 1949		End of 1950	
											End of 1949			End of 1950						
		Bbls. Daily Production			Bbls. Daily Production							*Bbls. Daily Production			Bbls. Daily Production			†Bbls. Day Prod. Per Well		Bbls. Day Prod. Per Well
	Wells	Total	Per Well	Wells	Total	Per Well	End of 1949	End of 1950	End of 1949	End of 1950	Wells	Total	Per Well	Wells	Total	Per Well	Wells		Wells	
Alabama									39	58	39	1,500	38.5	58	2,650	45.9	39	38.5	58	45.7
Arkansas	125	4,200	33.6	46	4,400	95.7	291	361	3,076	3,266	3,367	74,500	22.1	3,627	81,700	22.5	3,492	22.5	3,673	23.4
California	67	2,950	44.0	89	2,750	30.9	2,373	2,143	22,127	25,963	24,500	865,850	35.3	28,106	959,350	34.1	24,567	35.4	28,195	34.1
San Joaquin Valley	67	2,950	44.0	89	2,750	30.9	1,339	1,348	11,054	13,740	12,393	379,850	30.7	15,088	422,950	28.0	12,460	30.7	15,177	28.0
Coastal District							576	515	2,705	3,179	3,281	178,800	54.5	3,694	186,150	50.4	3,281	54.5	3,694	50.4
Los Angeles Basin							458	280	8,368	9,044	8,826	307,200	34.8	9,324	350,250	37.6	8,826	34.8	9,324	37.6
Colorado							87	191	662	572	749	62,000	82.8	763	78,000	102.2	749	82.8	763	102.2
Florida							5	1	6	11	11	900	81.8	12	1,550	129.2	11	81.8	12	129.2
Illinois							71	16	31,169	33,113	31,240	178,800	5.7	33,129	171,150	5.2	31,240	5.7	33,129	5.2
Indiana							35	12	3,739	3,946	3,774	28,200	7.5	3,958	30,500	7.7	3,774	7.5	3,958	7.7
Kansas							62	73	29,033	30,093	29,095	284,200	9.8	30,166	310,750	10.3	29,095	9.8	30,166	10.3
Kentucky								5	14,895	15,260	14,895	25,300	1.7	15,265	30,800	2.0	14,895	1.7	15,265	2.0
Louisiana	769	22,100	28.7	815	25,250	31.0	3,320	3,477	6,689	7,667	10,009	536,400	53.6	11,144	591,100	53.0	10,778	51.8	11,959	51.5
North Louisiana	338	6,650	19.7	345	10,250	29.7	548	564	5,332	6,177	5,880	122,950	20.9	6,741	115,500	17.1	6,218	20.8	7,086	17.7
South Louisiana	431	15,450	35.8	470	15,000	31.9	2,772	2,913	1,357	1,490	4,129	413,450	100.1	4,403	475,600	108.0	4,560	94.1	4,873	100.7
Michigan							387	141	3,268	3,577	3,655	44,500	12.2	3,718	41,800	11.2	3,655	12.2	3,718	11.2
Mississippi	130	3,600	27.7	171	4,350	25.4	476	280	886	1,168	1,362	97,200	71.4	1,448	102,100	70.5	1,492	67.6	1,619	65.8
Missouri									88	88	88	100	1.1	88	100	1.1	88	1.1	88	1.1
Montana				6			39	20	2,865	3,086	2,904	22,900	7.9	3,106	24,100	7.8	2,904	7.9	3,112	7.8
Nebraska								35	62	107	62	1,400	22.6	142	5,850	41.2	62	22.6	142	41.2
New Mexico	55	100	1.8	45			3,014	3,232	2,509	2,597	5,523	130,200	23.6	5,829	129,350	22.2	5,578	23.4	5,874	22.2
Northwest New Mexico	37			37					39	40	39	350	9.0	40	350	8.8	76	9.0	77	8.8
Southeast New Mexico	18			8			3,014	3,232	2,470	2,557	5,484	129,850	23.7	5,789	129,000	22.3	5,502	23.7	5,797	22.3
New York									23,400	23,500	23,400	13,400	0.6	23,500	13,900	0.6	23,400	0.6	23,500	0.6
Ohio							60	50	21,740	21,430	21,800	9,100	0.4	21,480	7,900	0.4	21,800	0.4	21,480	0.4
Oklahoma							1,426	1,740	52,934	55,086	54,360	409,600	7.5	56,826	495,950	8.7	54,360	7.5	56,826	8.7
Pennsylvania									82,100	82,200	82,100	27,600	0.3	82,200	29,200	0.4	82,100	0.3	82,200	0.4
Tennessee									35	29	35	100	2.9	29	100	3.4	35	2.9	29	3.4
Texas	1,298	27,500	21.2	1,584	39,900	25.2	39,203	41,484	76,280	80,640	115,483	1,987,300	17.2	122,124	2,383,200	19.5	116,781	17.3	123,708	19.6
Dist. 1 South Central	5	50	10.0	8	50	6.3	276	283	3,291	3,426	3,567	26,050	7.3	3,709	31,000	8.4	3,572	7.3	3,717	8.4
Dist. 2 Middle Gulf	228	1,950	8.6	299	2,850	9.5	3,057	3,142	1,072	1,271	4,129	117,550	28.5	4,413	141,700	32.1	4,357	27.4	4,712	30.7
Dist. 3 Upper Gulf	446	18,400	41.3	543	20,150	37.1	4,839	4,986	4,391	4,822	9,230	368,700	39.9	9,808	426,500	43.5	9,676	40.0	10,351	43.2
Dist. 4 Lower Gulf-S.W.	212	2,700	12.7	227	3,250	14.3	4,205	4,545	5,535	5,788	9,740	186,800	19.2	10,333	218,900	21.2	9,952	19.0	10,560	21.0
Dist. 5 East Central	40	250	6.3	56	250	4.5	391	409	1,400	1,523	1,791	34,050	19.0	1,932	40,250	20.8	1,831	18.7	1,988	20.4
Dist. 6 East Texas Field							12,414	12,213	9,803	9,713	222,217	237,850	10.7	21,926	270,700	12.3	22,217	10.7	21,926	12.3
Dist. 6 Northeast	283	3,750	13.3	269	4,150	15.4	1,030	1,083	1,972	2,031	3,002	84,600	28.2	3,114	92,400	29.7	3,285	26.9	3,383	28.5
Dist. 7-B North Central	37	50	1.4	48	100	2.1	1,228	1,408	6,691	6,987	7,919	61,450	7.8	8,395	72,600	8.6	7,956	7.7	8,443	8.6
Dist. 7-C West Central	9	50	5.6	86	8,500	98.8	436	628	1,623	1,817	2,059	51,250	24.9	2,445	71,800	29.4	2,068	24.8	2,531	31.7
Dist. 8 West	23	250	10.9	30	500	16.7	10,253	11,629	13,595	15,231	23,848	585,950	24.6	26,860	778,150	29.0	23,871	24.6	26,890	29.0
Dist. 9 North	10	25	2.5	15	100	6.7	1,054	1,132	19,701	20,579	20,755	140,675	6.8	21,711	149,200	6.9	20,765	6.8	21,726	6.9
Dist. 10 Panhandle	5	25	5.0	3			20	26	7,206	7,452	7,226	92,375	12.8	7,478	90,000	12.0	7,231	12.8	7,481	12.0
Utah							22	3		30	22	22,900	131.8	33	3,500	106.1	22	131.8	33	106.1
Virginia									15	15	15	100	6.7	15	100	6.7	15	6.7	15	6.7
West Virginia									15,900	15,800	15,900	7,800	0.5	15,800	7,000	0.4	15,900	0.5	15,800	0.4
Wyoming	20	500	25.0	11	650	56.9	464	323	4,452	4,887	4,916	130,700	26.6	5,210	178,800	34.3	4,936	26.6	5,221	34.4
Total United States	2,464	60,950	24.7	2,767	77,300	27.9	51,335	53,587	397,969	414,189	449,304	4,942,550	11.0	467,776	5,680,500	12.1	451,768	11.1	470,543	12.2

* Production data based on API Weekly Reports for month of December.
† Based on total Condensate and Crude Production as shown separately here and as combined in table on U. S. Production by States.

Cummins® Custom-built Diesels

Built not once but Twice

Extra care in building means extra profits for power users



Typical of the extra care that goes into the building of *every* rugged, dependable Diesel is the tear-down of the engine after assembly. First the engine is run in on the test block. Then it is completely torn down and carefully re-inspected. After that it is re-assembled and tested *again*.

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REFINERY OPERATIONS

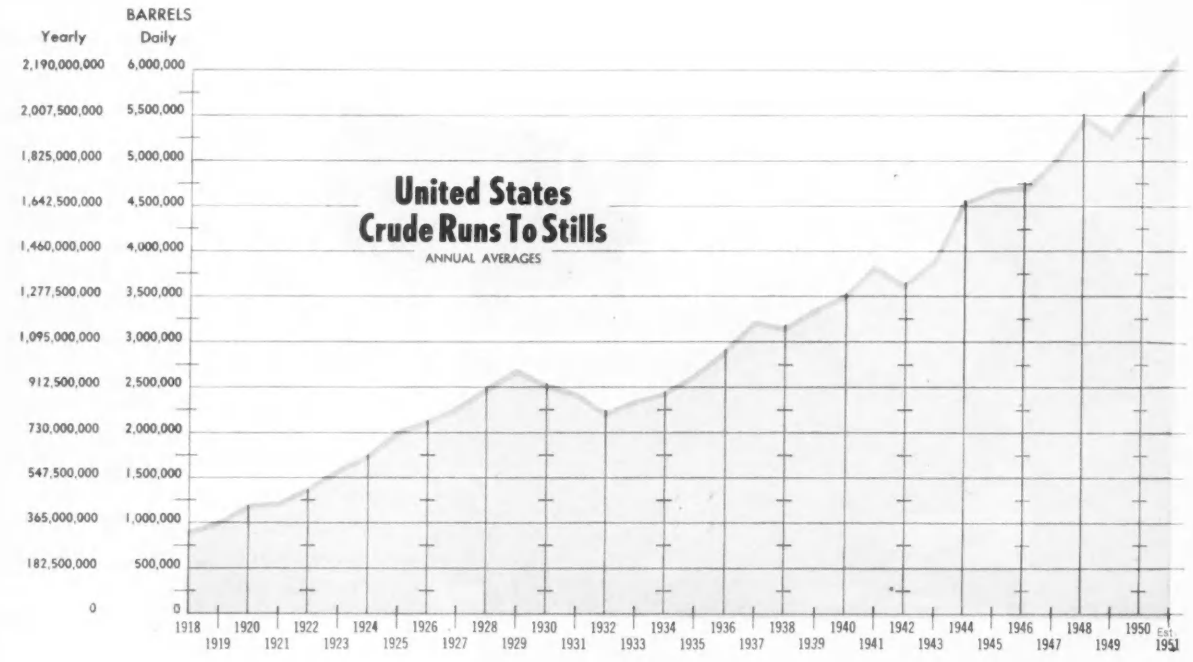
To Continue at Record Levels

NEW highs were established by U. S. refining operations during 1950. Daily average crude runs to stills reached an all-time peak of 5,735,000 barrels, a figure made possible in part by the highest refining capacity in the history of the nation—6,724,000 barrels per day by the end of the year. New records also were established for output of gasoline, distillate fuel oil, kerosine and lubricants.

Further peaks are indicated for 1951, with greater demand to require additional runs to manufacture enough products to satisfy requirements. Present estimates are that crude runs to stills will advance sharply to an average of 6,148,000 barrels daily, a gain of 413,000 barrels over 1950. This, however, would be only slightly larger than the runs to stills during the last five months of 1950, when runs climbed steadily to new peaks slightly in excess of 6 million daily.

Refinery gasoline output (straight run, cracked and natural blended at refineries) totaled 902,569,000 barrels during 1950, or 2,473,000 barrels per day. This was a gain of 6.0 percent over 1949 and 34.5 percent greater than in 1941. New highs in motor vehicle registrations were an important factor in creating the need for larger quantities of gasoline, there being 48,484,000 automobiles, trucks and buses in use in 1950 against 44,670,000 in 1949.

An unusually sharp gain in consumption of distillate fuel oils aided in boosting crude runs. Production of distillate fuel oils not only reached the high of 397,706,000 barrels during the year, but also took 21.3 percent of the crude run to stills as against 18.6 percent in the preceding year. The daily average output of 1,090,000

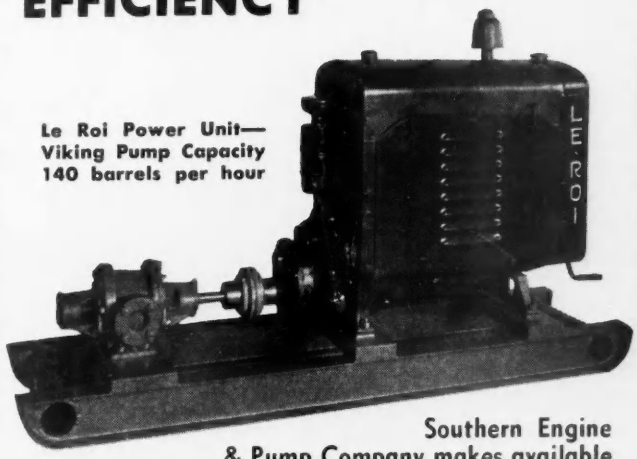


(All Figures in Barrels)

YEAR	Annual Total	Daily Average	YEAR	Annual Total	Daily Average	YEAR	Annual Total	Daily Average	YEAR	Annual Total	Daily Average
1918	326,025,000	893,200	1926	779,264,000	2,135,000	1934	895,636,000	2,453,800	1943	1,429,738,000	3,917,000
1919	361,520,000	990,500	1927	828,835,000	2,270,800	1935	965,790,000	2,646,000	1944	1,665,684,000	4,551,000
1920	433,915,000	1,185,600	1928	913,295,000	2,295,300	1936	1,068,570,000	2,919,000	1945	1,719,534,000	4,711,000
1921	443,363,000	1,214,700	1929	987,708,000	2,706,100	1937	1,183,440,000	3,242,000	1946	1,730,197,000	4,740,000
1922	500,706,000	1,371,800	1930	927,447,000	2,541,000	1938	1,165,015,000	3,191,800	1947	1,852,246,000	5,074,600
1923	581,238,600	1,592,400	1931	894,608,000	2,451,000	1939	1,237,840,000	3,391,000	1948	2,031,041,000	5,549,000
1924	643,719,000	1,758,800	1932	819,997,000	2,240,400	1940	1,294,283,000	3,536,300	1949	1,945,519,000	5,330,000
1925	739,920,000	2,027,200	1933	861,254,000	2,359,600	1941	1,409,192,000	3,860,800	1950	2,093,277,000	5,735,000
						1942	1,334,103,000	3,655,000	1951 Est.	2,244,020,000	6,148,000

Source: U. S. Bureau of Mines, except 1950, which has been calculated from Bureau of Mines for first 10 months and American Petroleum Institute weekly reports for last two months.

THE RIGHT TEAM FOR EFFICIENCY



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Check these advantages:

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- Helps prevent blowouts by showing the duration and relative amount of gas in gassy streaks.
- Increases accuracy in the use of weighting materials, chemicals, and water.
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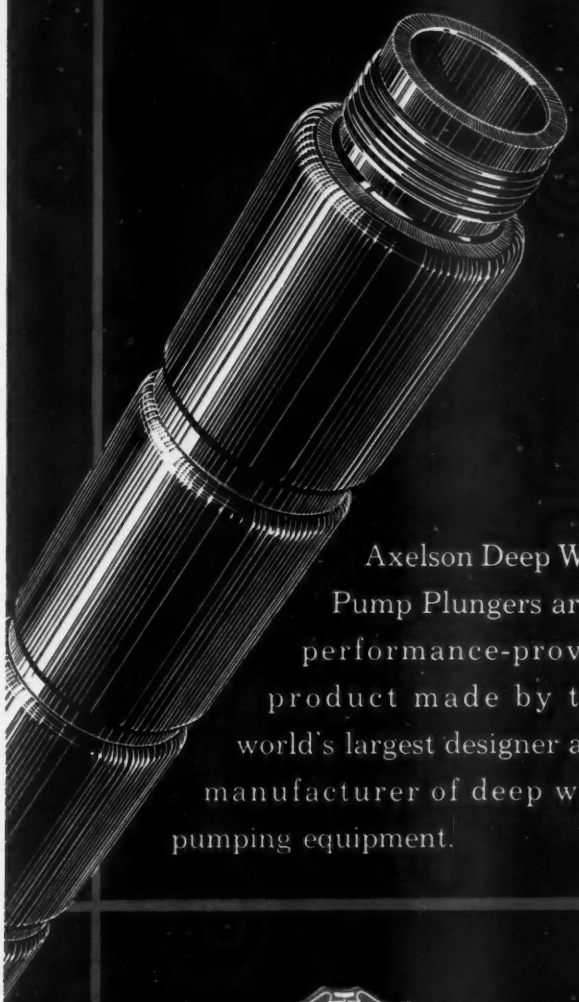

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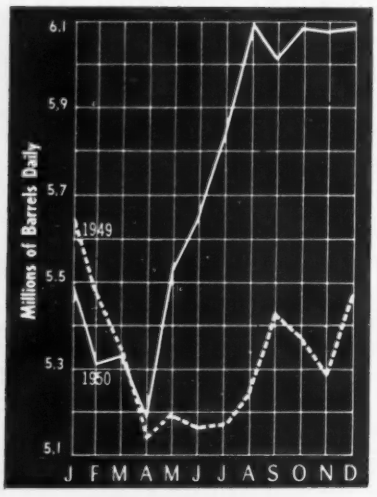
barrels of distillate fuel oil was up 17.1 percent from 1949. Directly related to the increased output of distillate fuel oils was the somewhat colder weather experienced in first and last quarters of 1950, a climb of 14 percent in the number of home oil burners in use, and continuing dieselization of the nation's railroads.

Lubricant production also set a new high, with a daily average of 141,000 barrels being produced to give a total of 51,431,000 barrels for the year as against 45,389,000 barrels in 1949, or a gain of 13.3 percent.

A survey of refinery production over a ten-year period shows surprising gains made throughout the industry. Gasoline production is up 34.5 percent, although the percent yield from crude has dropped from 45.7 to 42.3; kerosine shows a 62.8 percent increase for the decade, with the percent yield from crude being stepped up from 5.3 to 5.7 percent; distillate fuel oil is up 110.2 percent, with the percent yield from crude being upped from 13.7 to 21.3; residual fuel oils are up 13.8 percent, although the yield from crude has dropped from 24.9 to 20.9 percent over the ten-year span; and lubricants are up 30.1 percent, although requiring only 2.6 percent of the crude in 1950 as against 2.8 percent in 1941.



U. S. Daily Average Crude Runs to Stills by Months
(Barrels per Day)

MONTH	1949	1950
January	5,640,900	5,483,400
February	5,480,000	5,315,600
March	5,352,200	5,336,100
April	5,140,800	5,193,200
May	5,195,300	5,535,400
June	5,162,000	5,655,400
July	5,172,800	5,881,600
August	5,241,400	6,067,000
September	5,427,100	6,059,300
October	5,373,200	6,077,200
November	5,292,800	6,081,500
December	5,474,900	6,091,700

Source: U. S. Bureau of Mines except last two months of 1950 from API.

Refinery Production of Major Products and Percent Yield from Crude Run at U. S. Refineries

Results in December and Year, 1950, compared with same periods in 1949 and 1941. Figures are from Bureau of Mines except that November and December, 1950, are estimated with aid of A.P.I. weekly bulletins.

(THOUSANDS OF BARRELS)

ITEM	1941	1949	1950	% Diff. '41-'50	% Diff. '49-'50
***Gasoline:**					
Production, December	61,640	73,963	80,320	+ 30.3	+ 8.6
(Daily Average)	1,988	2,386	2,591	+ 30.3	+ 8.6
Percent Yield from Crude	45.7	43.0	42.3	.....	.....
Production, Whole Year	671,110	851,348	902,569	+ 34.5	+ 6.0
(Daily Average)	1,839	2,332	2,473	+ 34.5	+ 6.0
Kerosine:					
Production, December	6,682	10,755	10,911	+ 63.3	+ 1.5
(Daily Average)	216	347	352	+ 63.3	+ 1.5
Percent Yield from Crude	5.3	6.3	5.7	.....	.....
Production, Whole Year	72,586	102,152	118,138	+ 62.8	+ 15.6
(Daily Average)	199	280	324	+ 62.8	+ 15.6
Distillate Fuel Oil:					
Production, December	17,142	32,000	40,514	+136.3	+ 26.6
(Daily Average)	553	1,032	1,307	+136.3	+ 26.6
Percent Yield from Crude	13.7	18.6	21.3	.....	.....
Production, Whole Year	189,177	339,530	397,706	+110.2	+ 17.1
(Daily Average)	518	930	1,090	+110.2	+ 17.1
Residual Fuel Oil:					
Production, December	31,127	37,283	39,671	+ 27.4	+ 6.4
(Daily Average)	1,004	1,203	1,280	+ 27.4	+ 6.4
Percent Yield from Crude	24.9	21.7	20.9	.....	.....
Production, Whole Year	342,367	424,829	423,768	+ 23.8	— 0.3
(Daily Average)	938	1,163	1,161	+ 23.8	— 0.3
Lubricants:					
Production, December	3,554	4,100	4,900	+ 37.9	+ 19.5
(Daily Average)	115	132	158	+ 37.9	+ 19.5
Percent Yield from Crude	2.8	2.4	2.6	.....	.....
Production, Whole Year	39,539	45,389	51,431	+ 30.1	+ 13.3
(Daily Average)	108	124	141	+ 30.1	+ 13.3

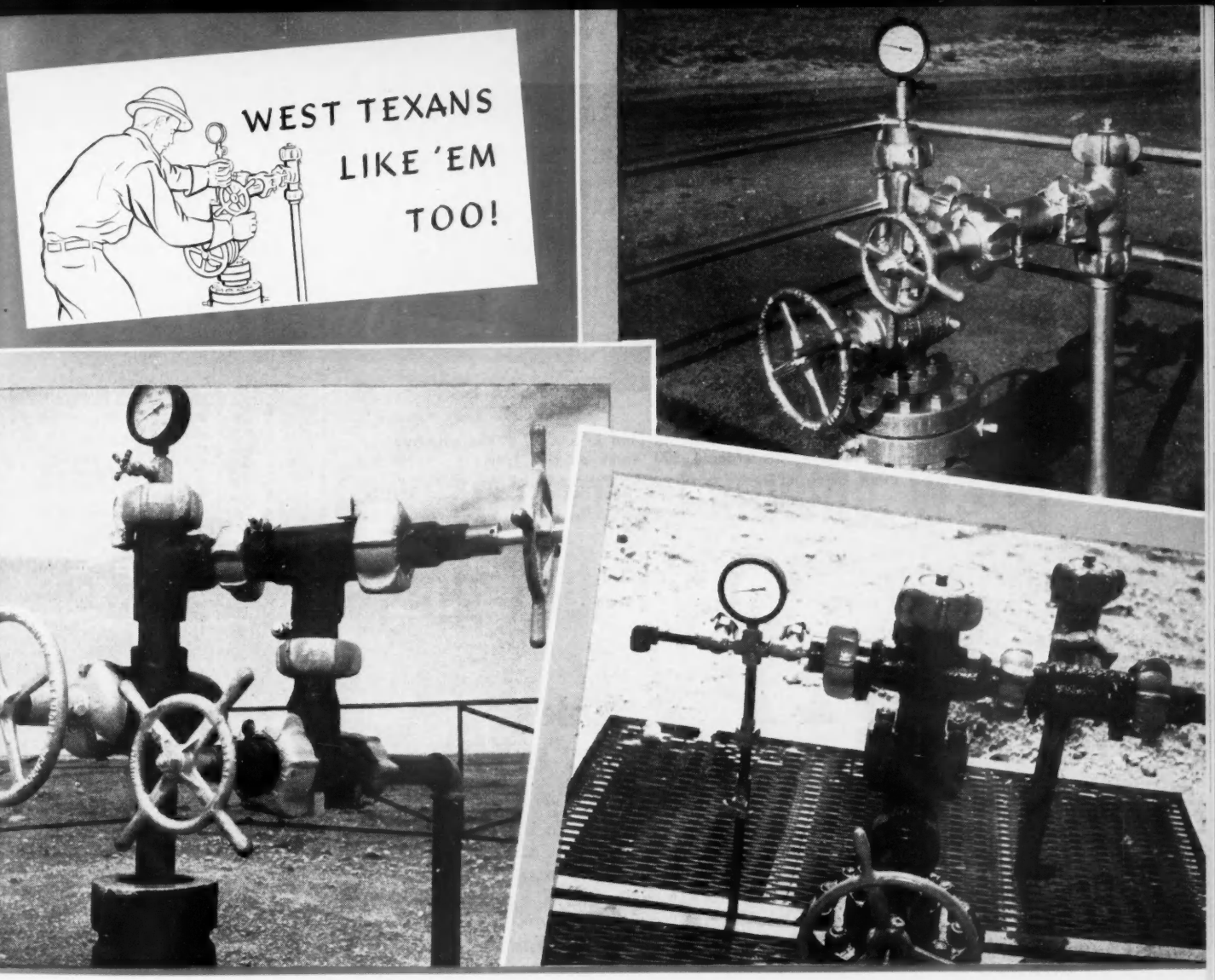
* Production includes straight run, cracked, and natural blended at refineries. Yield indicates percent of crude runs made into straight run and cracked gasoline.

Crude Runs to Stills at U. S. Refineries and Percent Refinery Capacity Used, by Districts, December and Years, 1941, 1949 and 1950.

Runs from Bureau of Mines, except November and December, 1950, from American Petroleum Institute: Capacities from American Petroleum Institute.

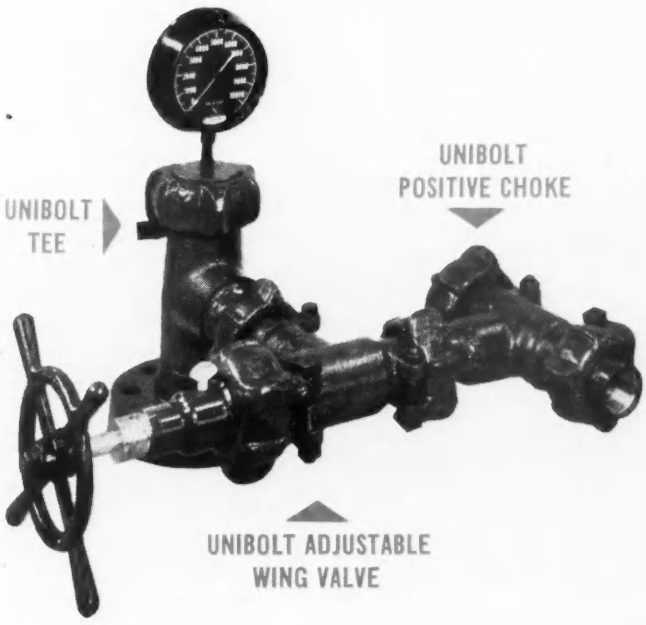
(THOUSANDS OF BARRELS)

Refining District	CRUDE RUN IN DECEMBER: Total Amount Run During Month				CRUDE RUN IN DECEMBER: Daily Average Run During Month			REFINING CAPACITY AND USE IN DECEMBER: Daily Capacity			REFINING CAPACITY AND USE IN DECEMBER: Percent Capacity Used			CRUDE RUN DURING YEAR: Total Amount Run During Year			CRUDE RUN DURING YEAR: Daily Average Run During Year			
	Dec., 1941	Dec., 1949	Dec., 1950	% Diff. '49-'50	Dec., 1941	Dec., 1949	Dec., 1950	Dec., 1941	Dec., 1949	Dec., 1950	Dec., 1941	Dec., 1949	Dec., 1950	1941	1949	1950	1941	1949	1950	% Diff. '49-'50
East Coast	19,750	26,478	29,288	+ 10.6	637	854	945	704	995	6,013	90.5	85.8	93.3	217,046	280,357	331,550	595	768	908	+ 18.2
Appalachian	4,575	4,905	4,721	— 3.8	148	158	153	174	193	191	85.1	164.5	163.0	53,499	56,551	60,018	147	155	164	+ 5.8
District No. 1	.....	2,942	2,714	— 7.7	.....	95	88	.....	118	117	.....	80.5	75.2	.....	33,415	34,760	.....	92	95	+ 3.3
District No. 2	.....	1,963	2,007	+ 2.2	.....	63	65	.....	75	74	.....	84.0	87.8	.....	23,136	25,258	.....	63	69	+ 9.5
Ill., Ind., Ky.	22,078	29,982	33,610	+ 12.1	712	967	1,084	776	1,134	1,178	91.8	85.3	92.0	251,257	333,954	378,197	688	915	1,036	+ 13.2
Okla., Kans., Mo.	10,711	13,557	16,013	+ 18.1	346	437	517	418	536	557	83.3	81.5	92.8	127,130	155,216	177,225	348	425	486	+ 14.4
Texas Inland	5,761	6,131	6,514	+ 6.2	186	198	210	265	277	279	70.2	71.5	75.3	66,640	79,281	75,876	183	217	208	— 4.1
Texas Gulf Coast	33,919	41,058	46,017	+ 12.1	1,094	1,324	1,484	1,117	1,582	1,592	97.9	83.7	93.2	363,252	469,402	478,633	995	1,286	1,311	+ 1.9
Louisiana Gulf Coast	4,925	14,107	15,442	+ 9.5	159	455	498	172	458	474	92.4	99.3	10.5	54,300	157,768	171,541	149	432	470	+ 8.8
Ark., and La. Inland	2,613	2,220	2,082	— 6.2	84	72	67	97	96	86	86.6	75.0	77.9	29,365	27,417	25,978	80	75	71	— 5.3
Rocky Mountains	2,848	5,771	6,878	+ 1.9	92	186	222	137	235	249	67.2	159.1	172.1	33,570	64,660	72,340	92	177	199	+ 12.4
District No. 3	.....	387	443	+ 14.5	.....	12	14	.....	15	17	.....	80.0	82.4	.....	4,317	4,985	.....	12	14	+ 16.7
District No. 4	.....	5,384	6,435	+ 19.5	.....	174	208	.....	220	232	.....	79.1	89.7	.....	60,343	67,355	.....	165	185	+ 12.1
California	17,805	25,514	28,278	+ 10.8	574	823	912	787	1,066	1,105	72.9	77.2	82.5	213,133	320,913	321,809	584	879	882	+ 0.3
Total United States	124,985	169,723	188,843	+ 11.3	4,032	5,475	6,092	4,647	6,572	6,724	86.8	83.3	90.6	1,409,192	1,945,519	2,093,167	3,861	5,331	5,735	+ 7.6



Views from Scurry, County, Texas

UNIBOLT *Flow Manifolds*



More and more operators are requesting their Christmas tree supplier to furnish UNIBOLT Flow Manifolds because they are lighter in weight, stronger, and more economical, and easier to maintain than ordinary flanged Christmas tree wings.

Employing standard UNIBOLT connections rather than flanges, the UNIBOLT Flow Manifold is many pounds lighter, yet the UNIBOLT design, which places more steel in shear, actually results in a higher factor of safety for the manifold.

The units of the manifold — UNIBOLT Tee or Cross, Adjustable Wing Valve, and Positive Choke Body — are pressure-tested as a unit and may be assembled in a number of combinations to best meet individual needs. They are furnished in regular forged steel or in high-chrome alloy for corrosive wells — 6,000, 10,000 and 15,000 lbs. test. The manifold is completely salvageable.

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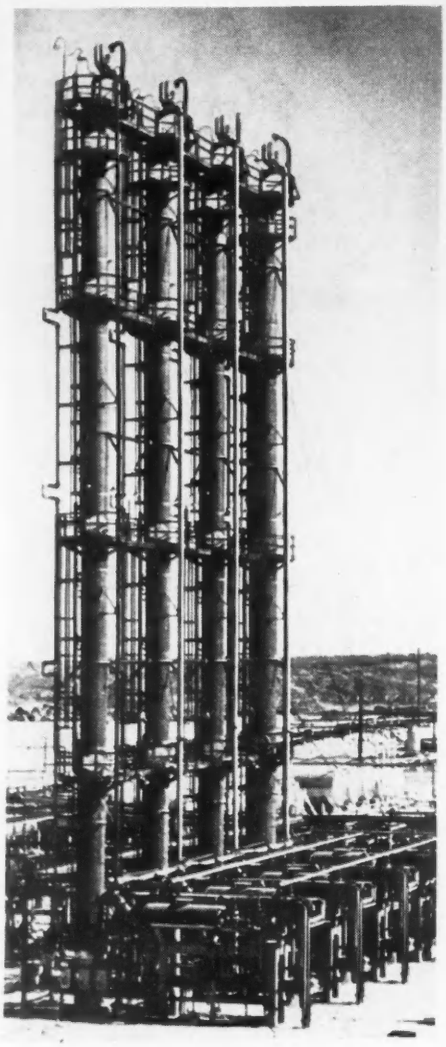

1950 LPG Sales Up 25.4 Percent

By

K. W. RUGH
Manager, Philgas Division-Sales Department, Phillips Petroleum Company

and

G. R. BENZ
Manager, Chemical Engineering Division-Research & Development Department, Phillips Petroleum Company

DURING 1950 the liquefied petroleum gas industry continued its steady expansion and growth. Sales of LPG in 1950 reached an estimated 3333 million gallons, exclusive of any product used in the manufacture of aviation and motor gasoline and synthetic rubber. This represents an increase of 25.4 percent over 1949 sales, and is more than triple the volume sold in 1945.

In barely 25 years, the LPG industry has grown from its infancy to a major industry serving hundreds of industrial, utility and chemical manufacturing plants and millions of farms and suburban homes beyond the gas mains. This large, responsible industry now renders its important services and products, directly or indirectly, to more families than does the manufactured gas industry, and to about two-thirds as many as does the natural gas industry. As such, the LPG industry is now of significance both in relation to other major U. S. industries and to the nation's total economy.

● Domestic Use. Estimated sales of LPG for domestic purposes in 1950 were 2143 million gallons. This is greater than the industry's total sales for all uses as recently as 1947, and is an increase of 31.7 percent over sales for domestic purposes in 1949. It is estimated that there were approximately 7½ million LPG installations on farms and in suburban areas at the close of 1950. During the year, the industry initiated an extensive cooperative program to advertise and promote the use of LPG at the retail level. This is a joint venture of the Liquefied Petroleum Gas Association, Natural Gasoline Association of America, Gas Appliance Manufacturers Association, and the National Butane-Propane Association. Initial ads appeared in magazines and farm papers during the summer of 1950 and, with well over 600 companies already participating in the program, its success appears assured.

Approximately 713,000 of the gas ranges produced in 1950 were specifically made for use with LPG. In addition, a large number of the gas ranges produced were adaptable—with minor changes—to various alternate fuels, including LPG, and a sizable quantity of such ranges undoubtedly went into the LPG market. An estimated 315,000 of the gas-fired automatic water heaters manufactured in 1950 went to LPG users. The increasing acceptance of LPG for house heating is indicated by the estimates that 20 percent of the gas-fired direct heating equipment and 12 percent of the gas-fired floor furnaces manufactured in 1950 were made for LPG. The total retail value of equipment and appliances of all types sold for domestic use by the LPG industry in

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Water forced through the fine pores of oil sand *must be* properly *conditioned* or plugging is sure to result. As a producer you can't take chances. Other producers have eliminated this problem by the installation of Infilco water conditioning plants. These efficient plants remove suspended solids, and prevent the formation of chemical reaction products and organic growths on the face of the formation. Some producers use water from lime formations, some from nearby lakes, some from streams, but, in every case *exclusive* and *time-tested* Infilco methods and equipment assure them a crystal clear, chemically stable water that is ideally suited for flooding purposes.

You can expect the same performance from Infilco water conditioning equipment on your producing site. The reason? Infilco's free laboratory service determines the exact characteristics of your water supply. Then, by combining over 55 years of water conditioning research and experience with the freedom of being able to select from a *complete range* of Infilco designed and manufactured equipment, a plant is recommended which exactly fits *your* needs.

Make sure the water you put in your wells produces results—not failures. Call in the nearest Infilco Field Engineer. Or write our executive offices in Tucson for free laboratory and water analysis service. There's no obligation, of course—only the obligation to yourself to investigate the offerings of the leader—*Infilco!*

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WORLD'S LEADING MANUFACTURERS OF WATER CONDITIONING AND WASTE TREATING EQUIPMENT

1950 is estimated at $\frac{1}{3}$ billion, and this figure does not include the retail value of the LPG itself sold for domestic use by the industry. At the close of the year, most LPG distributors were faced with spotty shortages of appliances and equipment on one hand and a relatively strong consumer buyer's market on the other hand.

The year showed a marked acceleration of the important trend to the use of LPG as fuel for farm tractors and irrigation pumping units. This program—aggressively promoted and merchandised by the LPG industry—has been stimulated by the increased availability of LPG on farms, the economy and superior performance of tractors using this fuel, and the development of low cost conversion equipment. It is estimated that more than 100,000 LPG conversion kits for farm tractors were sold in 1950. This figure is equal to over 22 percent of the total domestic shipments of wheel-type farm tractors made in 1950. In addition, many major tractor manufacturers are now offering tractors factory engineered and produced to burn this superior fuel, or factory approved LPG conversion kits both for their new tractors and for those already in use.

A continuation of the trend toward bulk distribution of LPG for space heating and other multiple uses on farms and in suburban homes was also very apparent in 1950. The continued rapid growth of domestic use of LPG was coupled with expansion of this phase of the industry's distribution system, and it is estimated that there are presently more than 4000 LPG bulk plants.

● Industrial Use. The effects on industry of a generally high level of business activity throughout the year, as well as the effects of the military preparedness program, were apparent in the increased use of LPG by most industrial companies. Sales for industrial and miscellaneous purposes in 1950 reached an estimated 300 million gallons, representing an increase of 21.4 percent over that consumed in 1949. This was the largest percent increase enjoyed by this phase of the industry since 1941, and took place in spite of the increased availability of natural gas to industrial plants in many areas.

● Utilities. Sales of LPG for gas manufacturing purposes are estimated at 240 million gallons in 1950, approximately the same as in 1949. Completion of natural gas lines to new areas, and expansion of natural gas facilities to areas already served, continued. Relatively warm weather during the first two months of the year also reduced appreciably the requirements of utilities using this fuel on a standby basis for peak load shaving or emergency conditions. The same climatic conditions affected sales to many of the 439 towns served by 288 utilities using LPG as their sole source of supply. All of these factors—none of which can be regarded as having a permanent downward effect on the sale of LPG to utilities—were sufficient to balance the increases due to normal expansion of existing facilities and conversion of a few plants from other fuels.

● Chemical Manufacture. The sale of LPG as base material for the manufacture of chemicals and chemical intermediates was at a new high during 1950. Estimated sales totaled 650 million gallons, an increase of 19.3 percent over sales in 1949. Chemical manufacture continued to be the second largest market, exceeded only by the domestic market, and it is important to note that the large volume of LPG (estimated at 207 million gallons in 1950) used in the manufacture of synthetic rubber is entirely excluded from this report.

Among the more important chemicals manufactured from LPG hydrocarbons are alcohols, detergents, plastics, resins, glycols, acetates, antioxidants and special solvents.

The proximity of a source of LPG has become a major factor in selecting the location of new chemical manufacturing facilities. The rapid extension of natural gas pipe lines into the midwest and East has provided an excellent carrier for the light hydrocarbons, and LPG extraction plants are being considered for strategic locations along such pipe lines. Both refinery and natural gas source LPG hydrocarbons are extensively used in manufacturing chemicals, with the refineries supplying about 45 percent, and the natural gasoline and cycling plants supplying about 55 percent.

● Motor Fuel. Consumer interest in the use of LPG as a fuel for internal combustion engines increased tremendously in 1950, particularly in the farm tractor and bus fields. Sales of LPG as tractor fuel are reported under the "Domestic" heading and have already been commented on. Sales to most other types of vehicles, including buses and trucks, are reported under the "Industrial and miscellaneous" category. Of great significance to the LPG industry is that

Marketed Production of Liquefied Petroleum Gas

YEAR	TOTAL SALES		DISTRIBUTION—1000 Gallons							
	Gallons in Thousands	Percent Increase	Domestic[1]	Percent Increase	Ind. and Miscl.[2]	Percent Increase	Gas Mfg.	Percent Increase	Chemical Mfg.	Percent Increase
1922	223	.....								
1923	277	24.4								
1924	376	36.0	Sale of Liquid Petroleum Gas Confined Primarily to Bottled Gas Business Prior to 1928							
1925	404	7.2								
1926	465	15.2								
1927	1,091	134.6								
1928	4,523	314.6	2,600	.....	400	.....	1,500	.....	.....	.....
1929	9,931	119.6	5,900	126.9	1,500	275.0	2,500	66.7	.....	.....
1930	18,017	81.4	11,800	100.0	2,200	46.7	4,000	60.0	.....	.....
1931	28,770	59.7	15,295	29.6	7,172	226.0	6,303	57 6	.....	.....
1932	34,115	18.6	16,244	6.2	8,167	13.9	9,703	53.9	.....	.....
1933	38,931	14.1	16,626	2.3	13,987	71.3	8,318	—14 3	.....	.....
1934	56,427	44.9	17,681	6.3	32,448	132.0	6,298	—24.3	.....	.....
1935	76,855	36.2	21,380	20.9	47,894	47.6	7,581	20.4	.....	.....
1936	106,652	38.8	30,014	40.4	67,267	40.4	9,371	23.6	.....	.....
1937	141,400	32.6	40,823	36.0	62,610	[3]	11,175	19.3	26,792	.....
1938	165,201	16.8	57,832	41.7	62,694	0.0	12,386	10.8	32,299	20.5
1939	223,580	35.3	87,530	51.4	93,723	49.4	15,435	24.6	26,892	—16.7
1940	312,456	40.2	134,018	53.1	124,482	32.8	20,285	31.4	34,671	29.0
1941	462,852	47.7	220,722	64.7	172,669	38.6	25,255	24.5	44,206	27.5
1942	585,440	26.5	303,857	37.6	197,179	14.2	31,366	24.2	53,038	20.0
1943	675,233	15.3	344,962	13.6	237,396	20.4	37,519	19.6	55,356	4.4
1944	898,071	33.0	445,617	29.2	254,590	7.3	45,879	22.3	151,985	175.0
1945	1,067,979	19.0	533,262	19.7	256,577	0.8	53,849	17.4	224,291	47.5
1946	1,410,370	32.1	758,466	42.2	253,745	—1.1	86,660	61.0	311,499	38.8
1947	2,008 262	42.4	1,150,538	51.7	274,125	8.0	169,332	95.4	414 267	33.0
1948	2,511,160	25.0	1,473,289	28.1	275,883	0.6	237,638	40.3	524,350	26.6
1949	2,658,749	5.9	1,627,550	10.5	247,103	—10.4	239,210	0.6	544,886	3.9
1950	3,333,000	25.4	2,143,000	31.7	300,000	21.4	240,000	0.3	650,000	19.3

[1] Household use plus other requirements by these customers such as irrigation pumping, tractor fuel, flame weeding, chicken brooding and similar uses. Included also is LP-Gas sold by domestic distributors but used for industrial purposes, internal combustion engine fuel and for gas manufacturing purposes.

[2] Includes LP-Gas sold for fueling internal combustion engines.

[3] Not comparable due to segregation of chemical manufacturing.

REMARKS: In this table total sales for all years except 1950, were obtained from U. S. Bureau of Mines reports. Distribution for the years 1931 to 1949, inclusive, was obtained from the same source. All other volumes were estimated by the writers. The total sales volume includes all LP-Gas (propane, butane and propane-butane mixtures) when sold as such. Until 1944 the sale of pentane when sold for any purpose other than motor fuel blending was included. Since then it has been excluded. It does not include butane when blended with heavier petroleum fractions for motor gasoline purposes. Intercompany sales transactions such as purchase of LP-Gases by one company from other companies and resold as LP-Gases have been eliminated in order to avoid duplication of sales figures. The data do not reflect sales of LP-Gases used directly by the producer at the point of production for fuel polymerization, solvent de-waxing, etc. Neither do the figures include sales of hydrocarbons to plants manufacturing synthetic rubber or aviation gasoline or their components.

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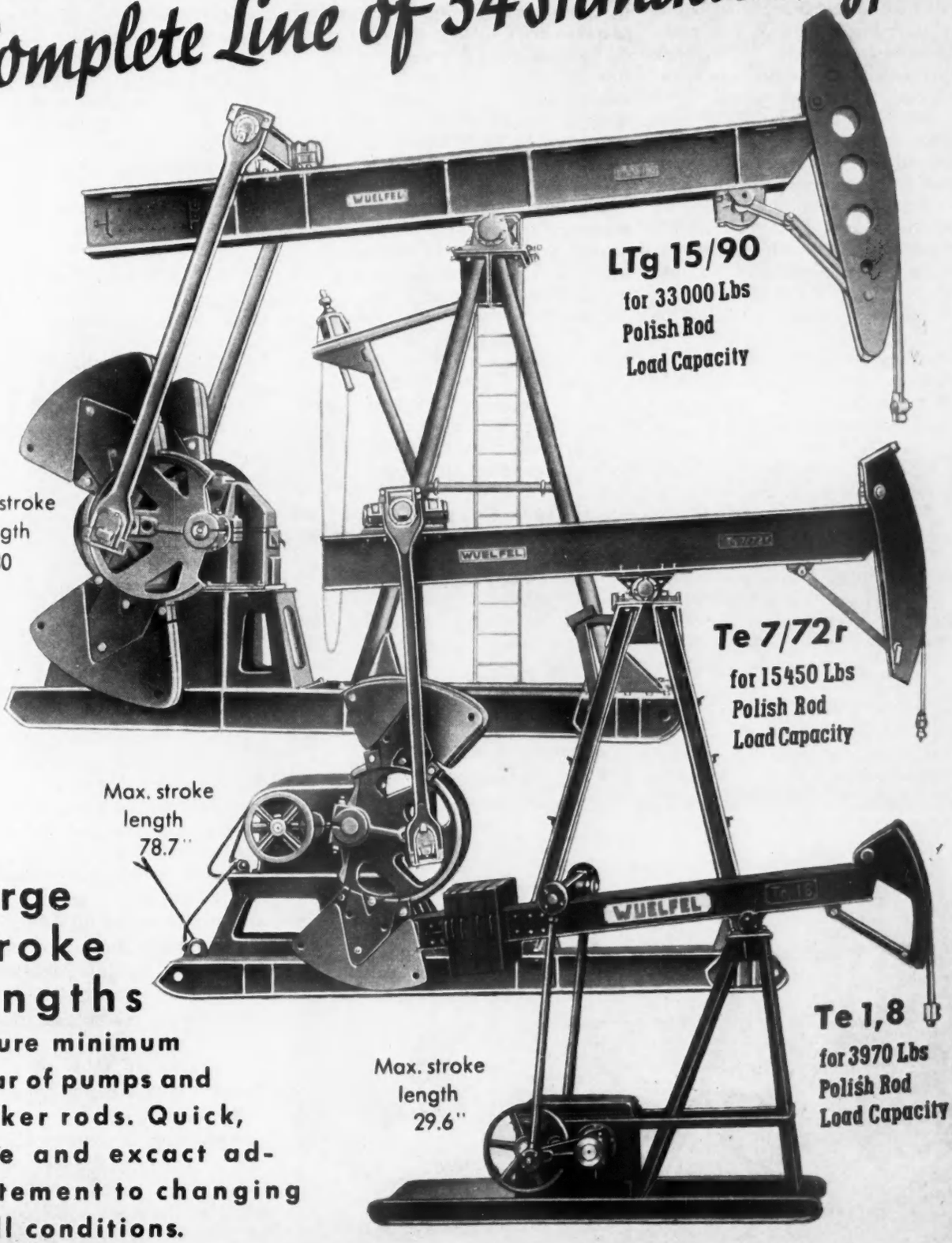

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buses are now being factory engineered and produced especially for LPG with as high as 12 to 1 compression ratio engines. During 1950 one of the country's largest bus systems placed a single order for 500 new buses of this type, in competition to bids offered by manufacturers of both diesel and gasoline fueled buses. Many other bus companies also completed arrangements in 1950 either to convert their present buses to LPG, or to buy factory produced LPG buses, and entered into LPG fuel purchase contracts during the year. Actual sales either started late in 1950 or are not planned until 1951, due to delays in obtaining conversion equipment or new LPG buses, with the result that 1950 sales figures do not include most of this new volume market.

Interest of truck fleet operators in this superior motor fuel was also much in evidence in 1950 with many experimental conversions being made on all types of truck fleets ranging from the relatively small operator to large inter-city freight lines. Taxicab fleets in many areas also evidenced much interest in LPG as a fuel to solve their special operating problems, with conversions to LPG being made or planned by many taxicab operators. Continued satisfaction with LPG as a fuel for heavy-duty mining equipment and off-highway construction machines resulted in gratifying increases in sales of products to this field.

The industry was far from being alone in its interest in the use of LPG as a fuel for internal combustion engines. Meetings of many various technical societies showed the keen interest of their members in LPG as an engine fuel by placing the subject high on the agenda of topics presented and discussed. Insistence of LPG marketers and producers alike—since the inception of the LPG industry—in selling high specification product has been of material benefit in capturing this rapidly expanding market. Even though the quality requirements of LPG used as motor fuel are the highest with which the industry has yet been generally confronted, no difficulty has been encountered by the industry in satisfying these demands with its standard products.

● Safety. The industry in 1950 continued the over-all excellent safety record which has characterized it since its very beginning. Such a record is obviously not achieved without constant safety activity at all levels of the industry and interest in the subject remained high in 1950. New and expanded uses of LPG resulted in many industry recommendations for new or revised portions to existing standards. The National Fire Protection Association and the National Board of Fire Underwriters both issued identical revised standards (known as Pamphlet 58) for the design, installation and construction of containers and pertinent equipment for the storage and handling of liquefied petroleum gases. These standards form the basis for regulations in practically all of the 48 states and this fact in itself speaks for the adequacy of the standards, which the LPG industry has assisted regulatory bodies to develop.

● Future Outlook. Any discussion of industry trends must necessarily be qualified by the effects on them of the apparently imminent military preparedness program and of world conditions generally. To the extent that the industry fails to receive adequate supplies of steel for LPG production, transportation, storage and utilization facilities, it will be unable to satisfy fully the steadily increasing demand for its products and services. In connection with the subject of steel supplies, a survey and study of the 1950 and 1951 steel requirements of the LPG industry's marketing section was made by an industry group in the summer of 1950. This information was subsequently included in the final report of the National Petroleum Council's Committee on Steel Requirements, and this report has since been presented to the government for study and action on behalf of the entire petroleum industry. Steel requirements of other sections of the LPG industry, including production and transportation, were likewise included in the final NPC report to the government.

● Domestic Use. The trend to bulk sales for multiple home and farm use—including particularly tractor fuel use and home heating—is firmly entrenched and should result in further increases in the average annual consumption per domestic installation. Acceptance of LPG as an ideal basic necessity fuel for homes and farms beyond the mains has already been well established and the trend toward suburban living adds daily to the large potential demand for the domestic use of LPG.

● Industrial Use. Continued high industrial activity foreshadows an increased use of LPG by industries. Extension and expansion of natural gas facilities will probably not affect this trend greatly, as increased interest in LPG as a standby fuel can be anticipated as utilities find it necessary to limit the winter supply to such industries. Increased activity in new defense plants should also account for certain new industrial LPG loads due, in part, to the expected decentralization of such plants to points beyond natural gas mains.

● Utility Use. Over a period of years it can be expected that normal weather conditions will prevail through the nation, reversing the trend of the relatively warm winters of 1948-49 and 1949-50. Winters of normal intensity and increased industrial activity caused by the defense program will tend to increase sales to utilities for the following reasons: (1) increased demand will directly

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affect shipments to utilities using LPG as their sole source of supply; (2) utilities using LPG as standby to their natural gas or manufactured gas facilities will have occasion periodically to place these facilities in operation, requiring additional supplies to handle this load; and (3) utilities distributing natural gas or manufactured gas and not now equipped with LPG standby facilities will again become active prospects for such LPG standby plants as their winter demands again approach the maximum sendout capacity of their present facilities. The economic advantages to smaller utilities of using LPG exclusively for distribution through their mains are well recognized and an extension of this trend can be expected.

● Chemical Use. Sharper demands for petroleum chemicals are resulting in plans for new facilities as well as expansion of existing facilities. Shortages in benzene, styrene and alcohols, in particular, are causing intense interest in the expanded use of LPG hydrocarbons in manufacturing these chemicals. The trend appears to be for propane to replace butanes as raw material, due partly to increasing demands for butanes in higher value markets, and partly to the tremendous increase in recovery of propane expected in the near future. The location of LPG extraction plants on natural gas pipe lines will permit location of petrochemical plants in areas some distance from oil fields, gas fields and refineries. It is expected that sales of LPG for chemical manufacture will increase at an accelerated rate, particularly as long as the present emergency conditions exist.

● Motor Fuel. Greater availability of LPG on farms coupled with the production of many new makes and models of tractors factory engineered for this superior fuel appear to insure greatly expanded sales for this market. Other contributing factors are the existence of low cost LPG conversion units and LPG consumer prices favoring the use of this fuel.

A continuation of the trend to LPG as a fuel for buses appears assured by numerous factors. Availability of buses factory engineered and built for LPG, assured savings in fuel and maintenance costs, and the many operating advantages to be had from this fuel are the major contributing causes to this bright outlook for the industry. Use of LPG for trucks will also undoubtedly make considerable additional progress as more major manufacturers of heavy-duty engines undertake the production of engines designed specifically to take full advantage of LPG. Continued rapid strides in the extension of LPG fueling facilities throughout the country will also be an important factor in the increased use of LPG for trucks.

Big Opportunity

The LPG industry, which contributed much to the war effort during World War II, can now be placed in a position to render far greater services to the country in any period of military crisis. In addition to supplying a basic and vitally necessary fuel to countless essential industries, farms and homes, LPG can be used to fuel buses, trucks and farm tractors and thereby replace billions of gallons of gasoline now used by these vehicles. This tremendous quantity of gasoline, released under emergency conditions to military and essential civilian requirements, could replace an amount corresponding to that normally refined from crude oil imports which might no longer be available; or assist in augmenting the supply of motor fuel for civilian use, which supply would be short of demand.

● Supply, Storage, Transportation. The opening of new gas and oil fields coupled with voluntary and regulatory efforts toward the conservation of our natural resources assures continued supplies of product for all users whose need for LPG is reasonably constant the year around. Various technical reports published in 1950 leave no doubt as to the enormity of LPG reserves in this country. Perhaps the most startling single fact brought to light in these reports is that reserves of LPG are now estimated to equal about 80 percent of the gasoline in our total petroleum reserves. Not only has this ratio been steadily increasing in favor of LPG for the past 20 years, but it is now estimated that the ratio will be even in the not too-distant future.

Actual production of LPG is more than sufficient to meet present requirements and the potential production from natural gas being processed and crude oil being refined is greatly in excess of today's demands for LPG. It is expected that the practice of storing LPG underground as a liquid near the source of production will be greatly expanded. Transportation facilities for movement of additional supplies of LPG are scheduled for completion and delivery in 1951. These additional transportation facilities include extension of LPG pipe line facilities, tank cars, barges and, of course, transport trucks.

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How to do it! PRODUCTION HINTS

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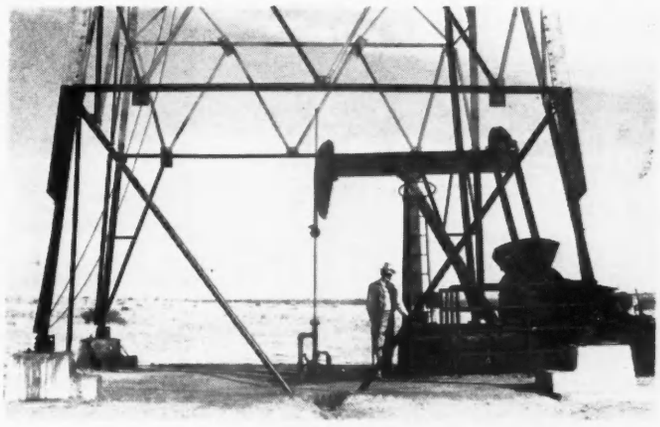
HOW TO—Reinforce Pulling Unit Pulley Hold-Down

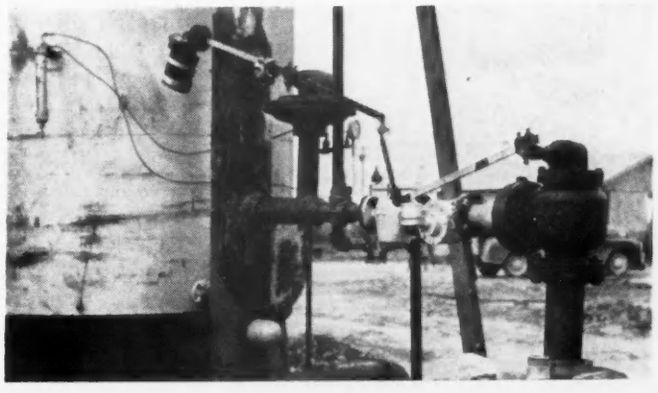


Wells equipped with production derricks require some form of pulley hold-down to deflect the direction of pulling line unless the pulling unit is backed up to the derrick so that the drum feedoff is inside the derrick girt. By providing a pulley at ground level to change the direction of wire rope, the unit may be located a safe distance from the well to reduce the fire hazard from exhaust or other sources of sparks.

On relatively deep wells, one of the problems incurred when installing a pulley hold-down is that of making it solid enough to withstand the strain imposed when heavy loads are raised. In such cases, a concrete foundation alone is not enough. To reinforce such pulley hold-downs on its producing wells so equipped, one company installed three-inch tubular braces which held the concrete block containing the pulley connection in place.

When the concrete pad was poured for the pulley hold-down, two flat surfaces were made on either side of the steel link connections. Bolts were set in the concrete to be attached to a foot plate welded to the bottom of the angular brace. The upper end of the brace, which formed approximately a 45-degree angle with the ground, was flattened and bolted to the derrick leg as shown at a point about six inches below the first girt. The leg was reinforced by adding a heavy steel plate about 8 feet long and 10 inches wide to the leg so that the mid-point of the plate was located at the juncture with the tubular brace. As the load is lifted by the pulling unit, a force is directed downward in each derrick leg, and thereby opposes the upward tending force due to the strain on the cable through the pulley attached to the hold-down. The wide V thus formed allows ample room for the crew to work.

HOW TO—Regulate Flow Rate Through Fluid Meter



On leases which employ hydraulic bottom-hole pumps with power oil discharged into and mixed with the produced oil, it is necessary to know the volume of oil used to power the pump which lifts the formation liquids to the surface in order to calculate the net oil produced from the lease. Where more than one such lease produces into a common tank battery, it is also necessary to measure accurately the volume of pipe line oil which each lease produces into the battery.

To eliminate separate measurement of such oil, an oil meter placed in the flow line leading to the stock tanks solves this problem of volume measurement. In the instance illustrated, a rotary-type liquid meter was used. In order to obtain maximum accuracy for the meter, it was found that regulation of the flow of fluid through the meter was necessary.

The meter is shown attached to the discharge line leading from the "boot" of a heater-treater. As the oil column builds up in the boot, the discharge regulator normally opens a pilot valve which in turn causes a diaphraghm-operated valve to open suddenly. To prevent such sudden surge of flow on the meter, a globe-type dump valve was installed, and interconnected with lever arms to the pilot regulator. As the head of oil builds up in the boot, the diaphragm rises and causes the weights shown at left to fall slowly. This action is transmitted to the dump valve which slowly begins to open.

In this manner, the velocity of flow past the liquid meter is altered from a sudden surge to a slow acceleration which gives the meter time to build up rotation to maximum flow of oil through the lines. This method of installation is expected to eliminate any slippage of oil past the vanes of the meter at the first sudden surge of oil that would pass when utilizing the quick-opening dump valve.

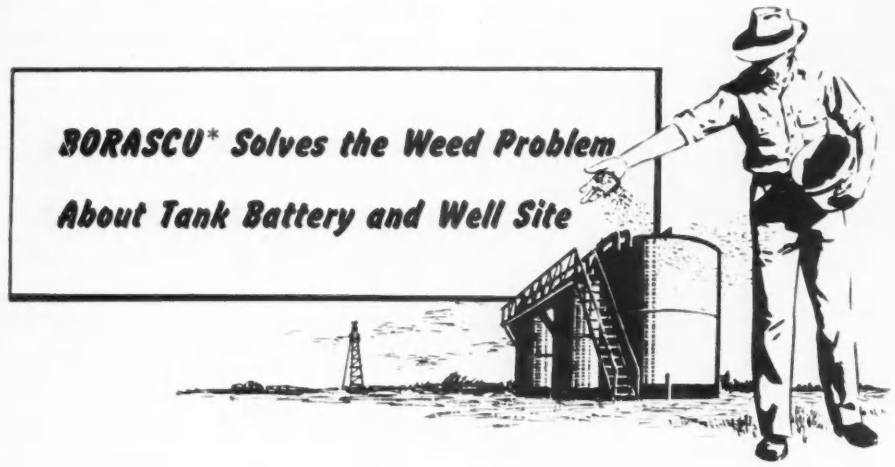
HOW TO—Anchor Pump Unit to Base

A time-saving and efficient method of anchoring the pumping unit to the concrete base, one which eliminates most of the work usually required for the laying out of anchor bolt locations, is employed by one producing company. The method involves the laying of a length of salvaged drill pipe down the center of the foundation, the top of the pipe being barely exposed at the surface of the slab. Before concrete is poured, however, a number of anchors, consisting of miscellaneous lengths

of small diameter pipe, reinforcing rod or other scrap steel materials, are welded to the side of the pipe and extended down into the foundation hole a distance of 18 inches to two feet.

After the slab has been poured and the cement is set up, the pumping unit is moved on and centered over the anchor pipe. Tiedown bolts are prepared and positioned at the several points along the length of the unit, then, at these points, slots are burned out of the exposed length of drill pipe. Length of each slot depends upon the probability of later having to shift the anchor bolts a few inches one way or the other in arriving at their final position. A slightly larger opening is cut out of one end of each slot enabling the anchor bolt head to be slipped down into the pipe. In the installation shown, the anchor bolts are passed through short lengths of pipe which span the pumping unit base members. The ends of these short pieces of pipe are notched so they will rest squarely on the surfaces of the skid base members.

This anchoring system is relatively simple to install and is easy to adapt to practically any type or size of pumping unit. One other advantage of this method lies in its adaptability to any other pumping unit that might be substituted at some later date. The only work necessary to make such a change would be the abandonment of the original slots and the cutting of new slots at the points where new tie-down bolts would be positioned. In either case—whether at the time the first unit is brought in or at the time another make or size unit is substituted—there is no need for precise laying-out of anchor bolts and grouting them in the slab.



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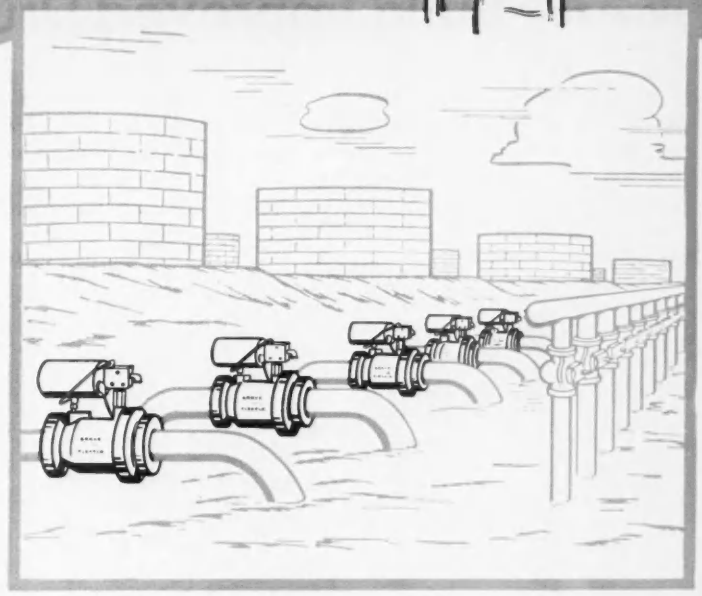
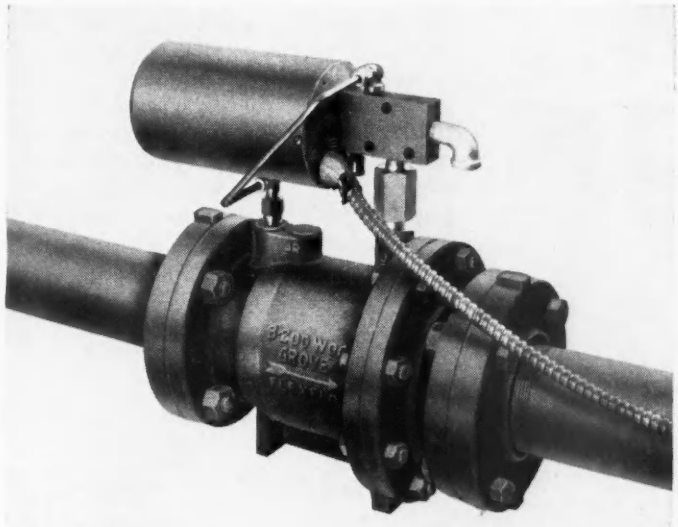
The Solenoid Pilot, mounted on the valve, is controlled from a remote panel. This Pilot uses the actual line pressure to open or close the FlexFlo. In this way the Grove FlexFlo Remote Control Valve can be operated as surely and easily as if the operator were at the valve.





The simple FlexFlo design has been proved in more than ten years of hard service to be unequalled for dependability and long, trouble-free life in the control of air, gas, oil, water, and salt water at temperatures to 150° F. and at pressures to 1500 p.s.i.

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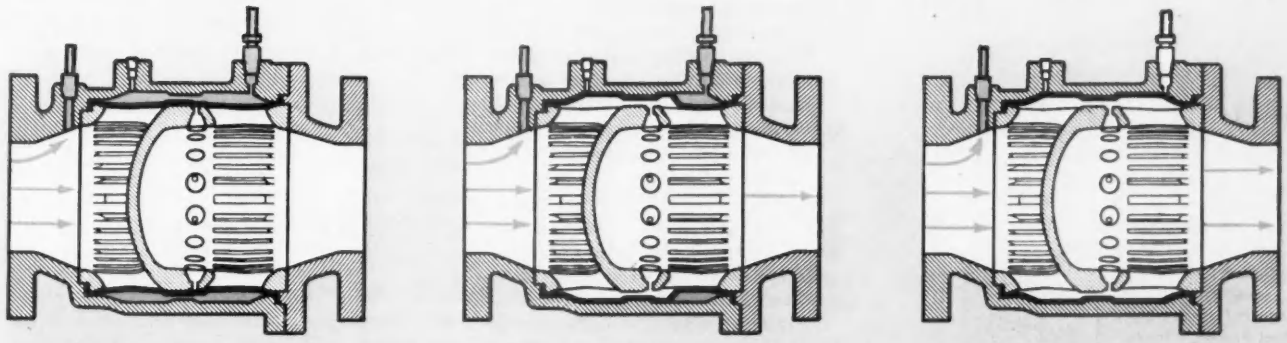


The only moving part in the Grove FlexFlo is a tough Buna N tube, which fits closely around a slotted metal core. When closed, line pressure from within, tending to force the tube off the core, is opposed by equal line pressure on the outside of the tube. Equalizing the inner and outer pressure allows the elasticity of the tube to grip tightly around the core with a positive, sealing action.

As the control pilot closes off line pressure acting on the outside of the tube, inner line pressure, being greater than the outer, begins to roll the tube off the core, opening the FlexFlo.

When pressure on the outer side of the tube is entirely removed, the inner pressure forces the tube completely off the slotted core, opening the valve wide and permitting free flow.

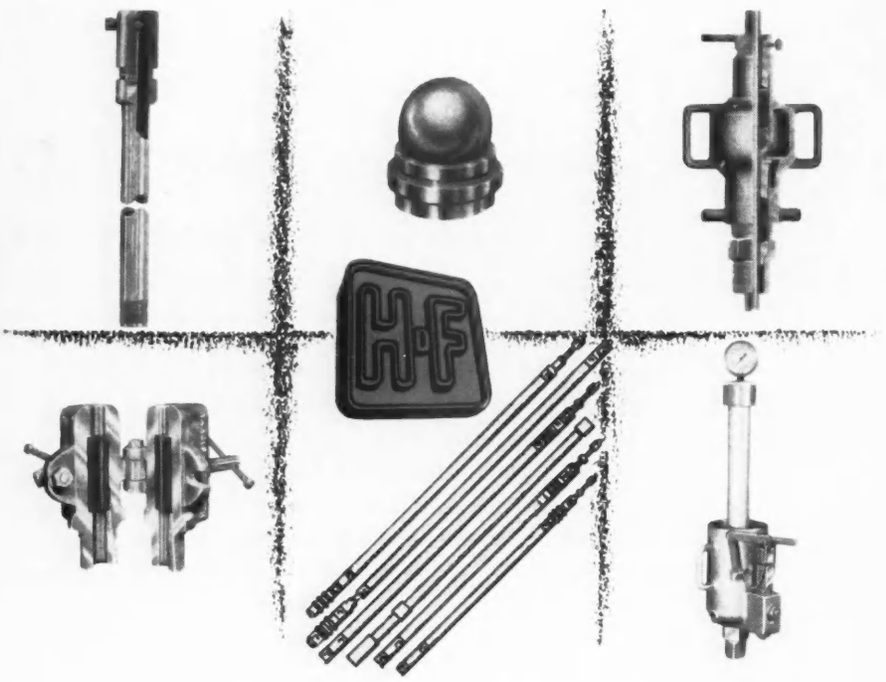
GROVE REGULATOR COMPANY

1901 CALUMET ST., HOUSTON 4, TEXAS • 6529 HOLLIS ST., OAKLAND, CALIF. • 1930 W. OLYMPIC BLVD., LOS ANGELES, CALIF.

HOW TO—Build Improved Drum Rack

An oil drum rack which easily is adaptable to the permanent or semi-permanent oil field installation is illustrated. Constructed principally of two-inch pipe and used sucker rod material, the rack is designed to cradle the drum and at the same time give it a downward slope toward the front to assure its being drained completely.

Of importance to the successful operation of the rack is the piece of angle material welded to the front of the rack, which prevents the drum from sliding forward. The rack can be made up as a single unit or as multiple units. In the case of the latter, a saving of weight and material is gained by being able to reduce the number of legs that ordinarily would be required on single units. Height of the rack is governed by the working height required and the problem of raising or tilting the full drums on to the rack. Such a rack is ideally suited to the needs of the pumper for dispensing regularly-needed lubricants or chemicals for well treatment.



Harbison-Fischer—from top to bottom . .

Stuffing Boxes to clean and lubricate polished rods during pumping operations . . . ***Oil Savers*** to wipe mud and oil from the line during swabbing, acidizing, and other wire line operations . . . ***Liner and Packing Clamp Assemblies*** for corroded or worn-out polished rods . . . ***Hydraulic Tubing Testers*** for detecting and locating leaks in tubing and collars . . . ***Balls and Seats*** in more than a dozen different grades and types . . . ***Tubing and Rod Pumps*** for every producing condition. *This and other Harbison-Fischer production equipment is sold through leading supply stores in all major producing areas. Look for the* H-F *trade-mark—it identifies the finest equipment in the oil country.*

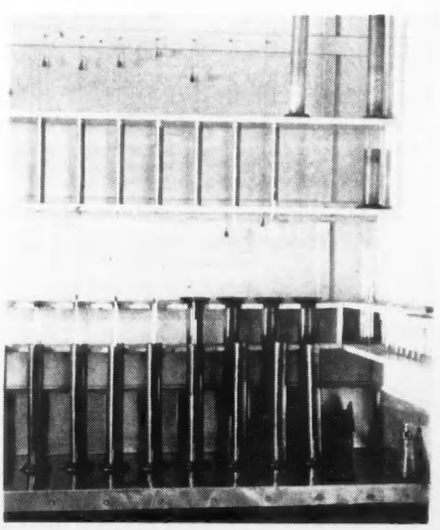
NEW LITERATURE ON H-F PUMPS

is available to operators at no cost or obligation. Recently published are 4-page, fully-illustrated folders on H-F Heavy-Duty Rod Pumps, "Texas" Stripper Well Rod Pumps, and H-F 3-Tube Rod Pumps. Ask at your supply store, or mail your inquiry to us at Box 64, Ft. Worth, Tex.

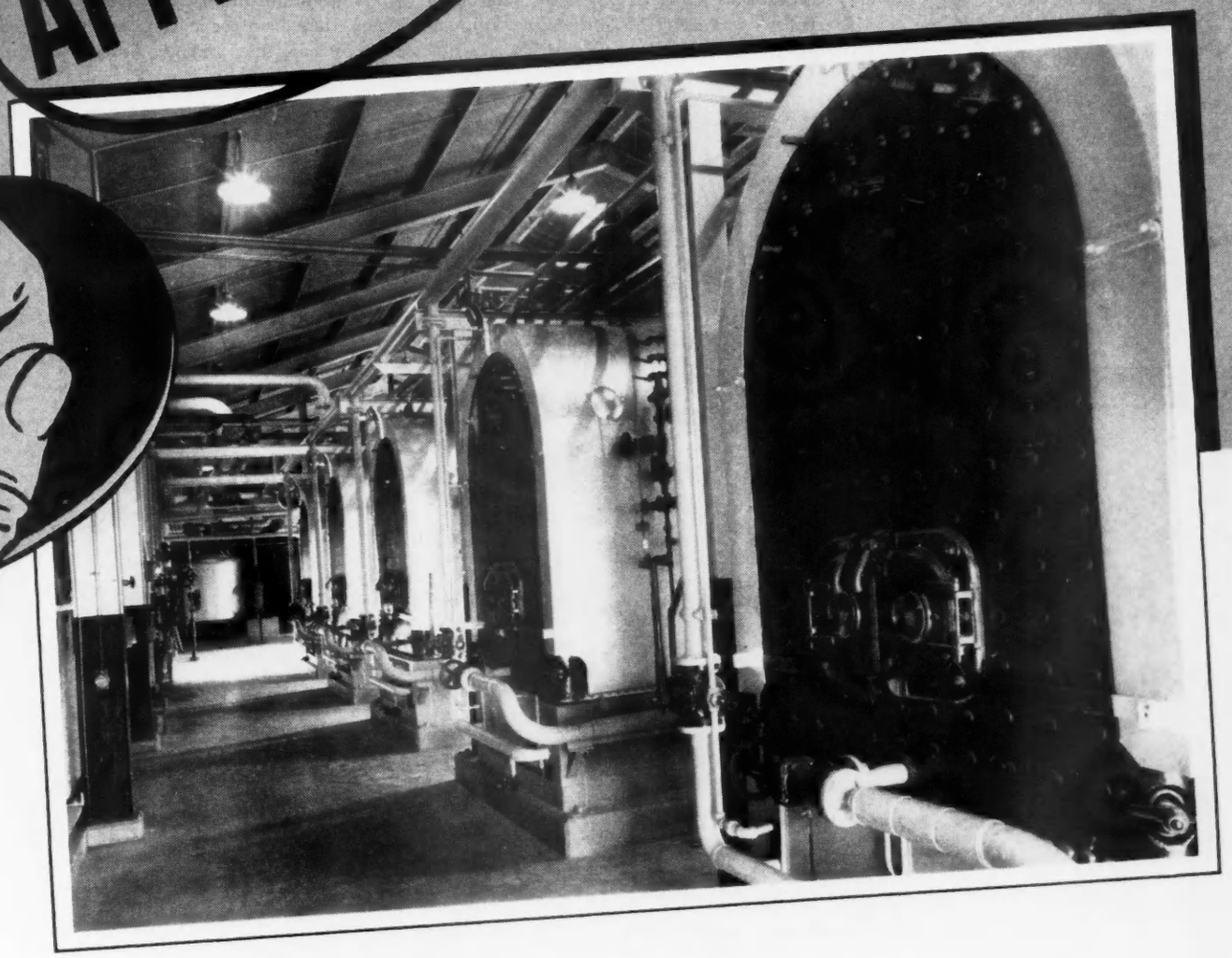
write HARBISON-FISCHER Mfg. Co., Ft. Worth

HOW TO—
Arrange Rack For Temperature Testing

When a large number of samples are tested daily in the lease laboratory, the mortality of thermometers is sometimes quite high. In order to prevent undue breakage of these expensive glass instru-



LUCEY BOILERS APPROVED in CANADA



For over 30 years, Lucey Boilers have been the "Standard Steam Boilers" all over the world. The above photo shows an installation of five Lucey 150 H.P., 150 lb. W.P. Boilers installed in a plant of one of Canada's great oil companies. The boiler design for the installation in Devon, Alberta, Canada, was approved and registered under the Canadian Inter-Provincial Regulations for use in Canada.

The safety features of all Lucey Boilers exceed all ASME and API Boiler Code Requirements. Let a Lucey representative show you the quickest, easiest and most economical installation for your money.

DISTRIBUTORS:

Lucey Products Corporation, Tulsa, Oklahoma
Houston Oil Field Material Co., Inc., Houston, Texas
Jones & Laughlin Supply Co., Tulsa, Oklahoma
Murray-Brooks, Inc., Lake Charles, Louisiana
Bethlehem Supply Co., of Calif., Los Angeles, Calif.
National Supply Co., Toledo, Ohio

EXPORT:

Lucey Export Corporation, 233 Broadway, New York 7, N. Y.
Broad Street House, E. C. 2, London, England

Lucey Boilers are approved for use in Canada

LUCEY

LUCEY BOILER and MANUFACTURING CORPORATION

Chattanooga, Tenn.

BETHLEHEM SUPPLY CO. OF CALIF.
6000 ALCOA AVENUE, VERNON
LOS ANGELES 54, CALIF.

413 STERLING BUILDING
HOUSTON, TEXAS

ments, one company provides guides and cases. Miniature sheaves are connected to the ceiling of the lab above each thermometer's protective case. Thermometers with eyelets in the upper end are finished in the building with plastic tubing as a buffer to absorb shock of contact between the glass and any other material.

Fishing line tied to the eyelet runs through the overhead sheave and down through guide rings. This end of the cord contains a lead weight, also a part of a fisherman's equipment. The size of the "sinker" is that which will balance the weight of the thermometer plus the line friction. Testing graduates are grouped on the stainless top lab table beneath the position of the thermometers so that one thermometer is supplied for each graduate.

Above the row of test equipment is a shelf containing two pieces of soft pine separated by tubes in which the thermometers were received. Thus, the shipping case for the thermometer acts as a scabbard for the instrument when it is raised from the testing graduate. Not only are the temperature tests facilitated, but the thermometers are always ready for use, and when stored after using, they are adequately protected. A second rack, installed behind and below the thermometer scabbards, has semicircular slots cut in the outside edge. This rack is used to store glass graduates in an upside-down position when they have been thoroughly washed so they may dry, and remain free of dust particles.

MORE

Production Profit with JENSEN

For over 30 years Jensen has been building dependable production equipment. Down through the years every new development has been incorporated in the unit to cut costs and increase useful life: oil bath lubrication, anti-friction bearings, electrically welded structure and base—and many others.

Our customers tell us these 30 years have been well spent, that they save more money—make more profit on every Jensen-produced well.

See your local dealer or write Coffeyville, Kansas and increase your profit.

JENSEN

Bros. Mfg. Co., Coffeyville, Kan.

Export Office: 50 CHURCH STREET, NEW YORK CITY

HOW TO—

Construct Stand for Fire Extinguishers

A simple, yet dependable fire extinguisher rack suitable for use in the field and which will support from one to four of the soda-acid type extinguishers, can easily be built. Illustrated is a support that consists of a single length of pipe set in the ground to the top of which is welded a previously-prepared steel plate. The plate is cut out in the form of a cross, the outer end of each arm being turned upward through 90 degrees so as to form a lip over which the side handle of the extinguisher can be hung. The rack is adaptable to both temporary and permanent installations, and can easily be constructed out of salvaged materials generally available on the lease. It is possible to hang as many as four fire extinguishers from one such rack, and each extinguisher is easily removed from the rack in times of emergency.

DO YOU OPERATE WITHIN THIS *Service* CIRCLE?

In Texas, western Louisiana, and New Mexico, WAUKESHA is ready to give you the dependable, personalized service that keeps your operations running smoothly and reduces your downtime to a minimum. Leading supply stores stock WAUKESHA engines, but, in addition, Waukesha Sales and Service maintains this network of service shops to give you the prompt service you need to keep present costs down.

WAUKESHA SALES & SERVICE, INC.

1422 MAURY STREET
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EXCLUSIVE DISTRIBUTORS FOR WAUKESHA PRODUCTS

IN TEXAS, LOUISIANA AND EASTERN NEW MEXICO

THERE'S A PIPER FOR EVERY OIL FIELD PURPOSE

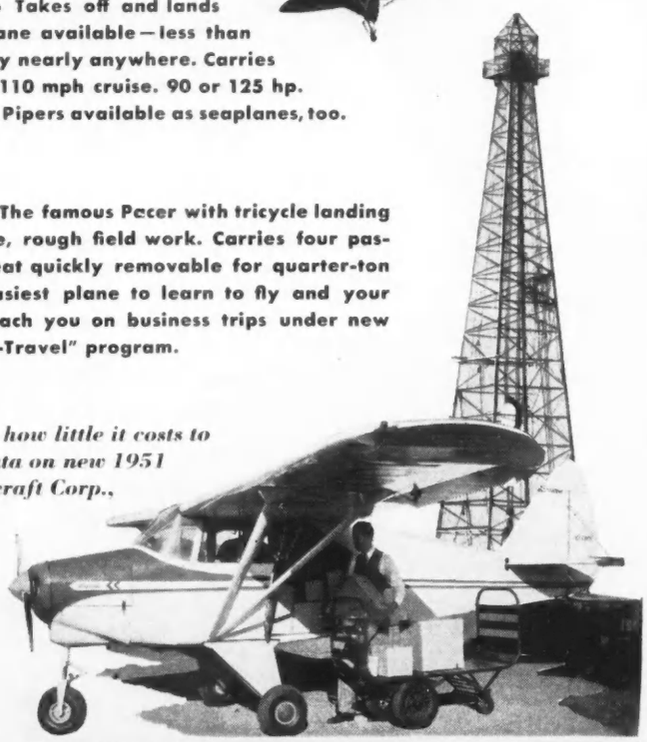
PIPER PACER. Lowest cost, most economical four-passenger plane available. Costs less to buy and fly than a fine car. 125 horsepower, up to 135 mph cruising speed. Ideal for executive or cargo use. Does work of two or three cars.

IT COSTS SO LITTLE TO FLY... CAN YOUR BUSINESS AFFORD NOT TO HAVE A PIPER?

THE SUPER CUB. Takes off and lands shorter than any plane available—less than 50 yards! Lets you fly nearly anywhere. Carries up to half-ton load. 110 mph cruise. 90 or 125 hp. Ideal for field work. Pipers available as seaplanes, too.

THE TRI PACER. The famous Pacer with tricycle landing gear for flying ease, rough field work. Carries four passengers with rear seat quickly removable for quarter-ton freight capacity. Easiest plane to learn to fly and your Piper dealer will teach you on business trips under new Piper "Learn-as-you-Travel" program.

For full information on how little it costs to fly a Piper and latest data on new 1951 models, write Piper Aircraft Corp., Dept. L-2, Lock Haven, Pennsylvania.

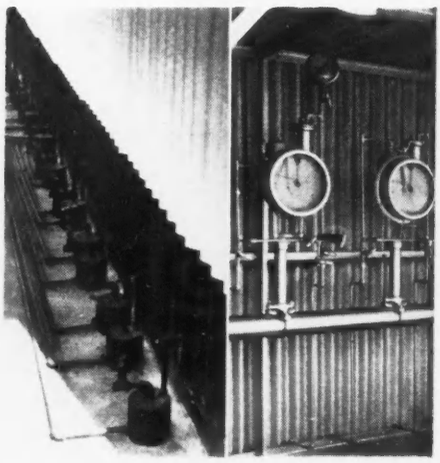


PIPER AIRCRAFT CORP., LOCK HAVEN, PA.

"TRAVEL FASTER, CHEAPER BY PIPER"

HOW TO—

Install Drip Pots At Meter Station



Where many pressure recorders are employed on leases producing gas from multiple zones and where some of the gas is sold to pipe lines, to gasoline plants and for field use, such recorders can be unitized under one sheet metal shed to provide easy chart reading, chart changing, maintenance and upkeep of the meters. On such group meter stations, the problem of eliminating condensate from the mercury pots is solved by making special drip pots and placing them side by side on the back side of the metal shed.

The instruments are grouped on a "hitch-rack" type support of four-inch pipe. Three vertical posts set in the concrete floor support a horizontal pipe welded to the top of each riser. The instruments mounted on this top rail are supplied with pipe saddle connections that include levelling set screws to retain the settings and to provide a means for level adjustments.

The piping to and from the instruments converges at the rear of the building. These lines are placed near the ground on permanent cribbing supports. Each line terminates in a drip pot, with each meter equipped with two pots, one for the differential pressure, the other for the flowing pressure. The pots are made of four-inch pipe about five inches long with flat heads and bottoms. Lines to the building connect to the bottom of the pots close to the base of the sides. Lines leading to the recorders inside leave the pots at the top. A bleeder in the center of the top is used to drain the pots when condensate accumulates in them. This line extends to the bottom of the pot. Needle valves in this bleeder line provide a means of recovering the contents of the pots.

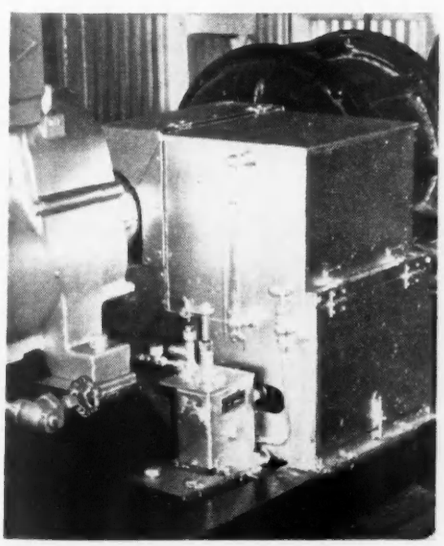
HOW TO—

Feed Chemical Into Power Oil System

Corrosion of tubing, casing and pumps can be mitigated in wells with hydraulic-powered, down-the-hole pumps without too much difficulty and additional equipment. One effective method is to inject the corrosion inhibiting chemicals in the oil used to power the pumps located down the well. This practice protects the inside of tubing and flow lines as well as separators, heat-treaters and stock tanks.

Here is an efficient installation which does provide for injecting the inhibitor into the power oil stream. The power oil pump shown is driven by an electric motor partially visible at right. Between the motor and the pump is the aluminum-painted chemical storage container. It is fitted with a sight gauge so the pumper may determine when it is necessary to refill the container. The force-feed injecting pump shown immediately in front of the container is mounted on a plate extension of the I-beam skid. The injector is powered by rotary motion on a take-off from the pump shaft. So long as the pump is operating, the injector is forcing the chemical inhibitor into the power oil at a rate proportional to the speed at which the power oil pump is operating.

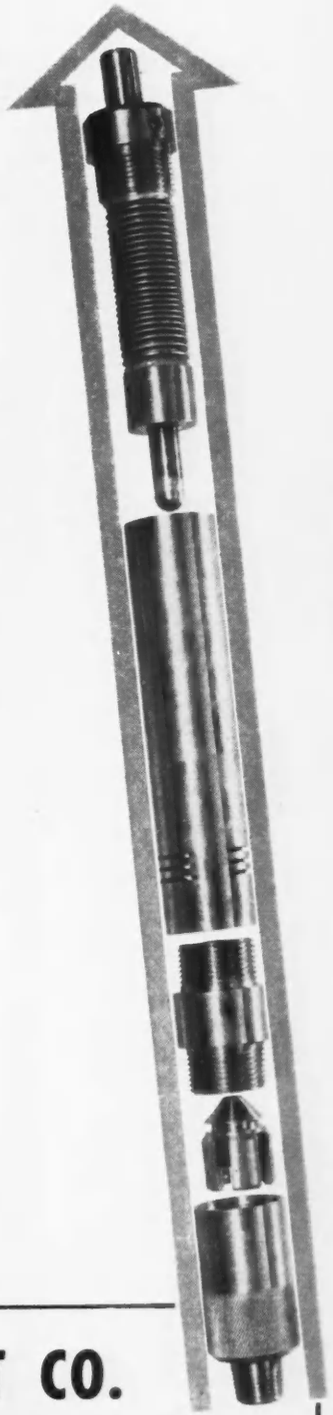
The copper tubing discharge line from the chemical injector is connected into the suction of the power oil pump. The chemical is then mixed with the power oil which is carried to the pump located in the tubing string. Since the power oil is discharged into the tubing and allowed to mingle with the reservoir fluid, the inside of the tubing is coated as the pump carries the combined fluid up to the surface and to the tank battery.



PIONEER

Pressure-Operated

GAS LIFT



There is a Pioneer Gas Lift Valve to meet all your gas lift requirements.

The Pressure Operated Pioneer Valve is manufactured of stainless steel and incorporates a 3 ply monel bellows for pressure actuation. The bellows assembly is fully tested and aged before being placed in service to assure maximum bellows life in operation. A spring loaded check valve guards against back flow through the injection valve.

Pioneer Gas Lift engineers are available on request to go over your installation and suggest proper spacing and operating pressures for the valves in any specific operation.

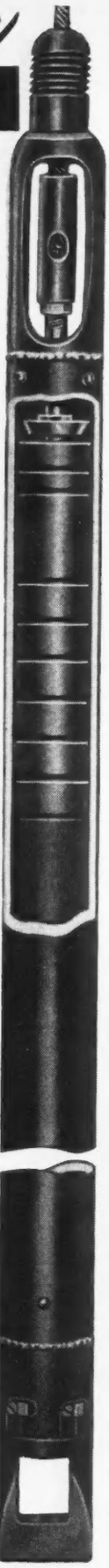
See your 18th edition of Composite Catalog for details.

PIONEER GAS LIFT CO.

Phone FAirfax 4768 424 Hogan Street

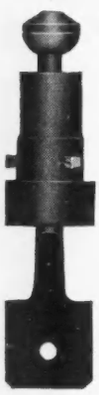
HOUSTON 9, TEXAS

Miller SAND PUMPS



In every major producing area where sand or sediment is a problem, you'll find Miller Sand Pumps and Bailers are standard . . . the leaders in clean-out equipment. For 26 years Miller has held this leadership, with continuous improvements and faithful service.

The Miller Sand Pump is made in regular and heavy duty types in sizes listed below. Lug type, chisel, sand and bailer bottoms are easily interchanged.



SAND PUMP and BAILER SIZES:

Outside Diameters

2½"
3"
3½"
4¼"
5"
5½"
7"

Lengths

20 feet
25 feet
30 feet

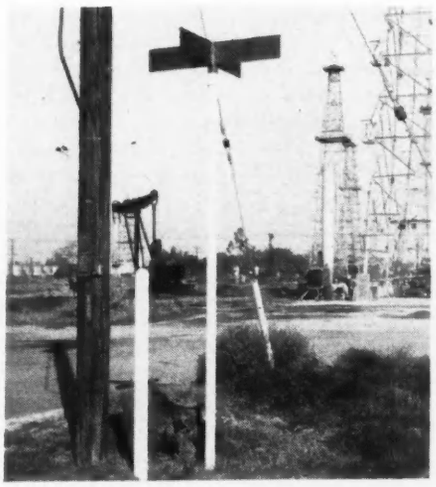
Special Sizes and Lengths Made to Order!

Write for new descriptive price list on Miller Sand Pumps and Bailers. See Composite Catalogue Page 3305 for details.

MILLER SAND PUMP CO.
1524 S. E. 29 St. . . . . Box 4516
OKLAHOMA CITY 9, OKLAHOMA

EXPORT OFFICE:
30 Rockefeller Plaza-New York 20, N.Y.

HOW TO—Mark Hydrant Locations



Confusion and lack of knowledge as to the exact location of fire fighting equipment and fire hydrants frequently can be the cause of considerably more fire damage than ordinarily might have resulted had equipment reached the scene earlier. To help identify and mark the location of fire hydrants on a certain producing property, one company has adopted the practice of erecting a permanent, easily-seen and identifiable "flag" beside each hydrant. The flag consists of a cross arm made from rectangular pieces of sheet steel painted a bright red, which is mounted atop a two-inch pipe post set in the ground beside the hydrant. This flag is visible from some distance away and from practically any direction.

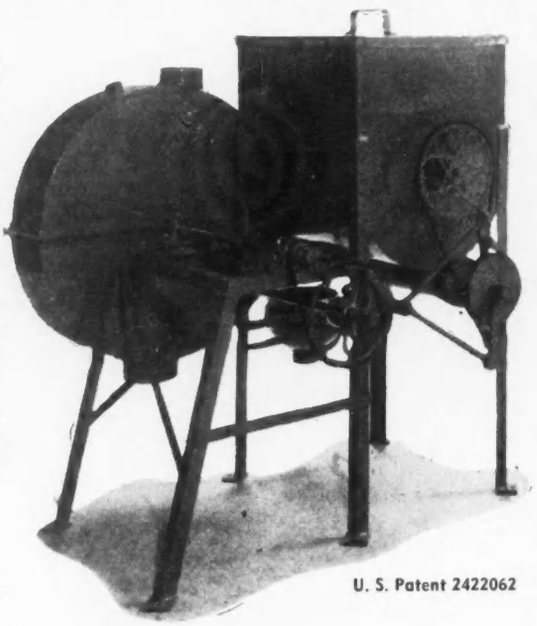
Elevated as it is above the average level of ground-level mounted equipment, it is quickly recognizable when and if a fire emergency occurs. Easily constructed and made of materials generally available in the salvage yard, its small cost is but a fraction of the savings that might accrue in reducing damages caused by fire.

THE
WESTERN CHEMICAL FEEDER
the dependable, economical water treater

CHECK THESE FEATURES:

- Used in Oil Well Water Flooding, Municipal Water Treating Plants, Canneries, etc.
- Can be driven by water entering plant for treatment.
- Maintains pre-set water-chemical ratio through a wide rate-of-flow range.
- Adjustable two ways, to feed from a few pounds to several hundred pounds of chemicals per day.
- Equipped with water wheel, gas engine, or electric motor.
- Made to your specifications in various sizes.
- In use the world over.

Whatever your water treating problems may be, investigate the Western Feeder. Write for literature and prices.



U. S. Patent 2422062

Manufactured By

KEYSTONE SUPPLY CO.

312 E. Cherokee St. NOWATA, OKLA. Phone LD-10

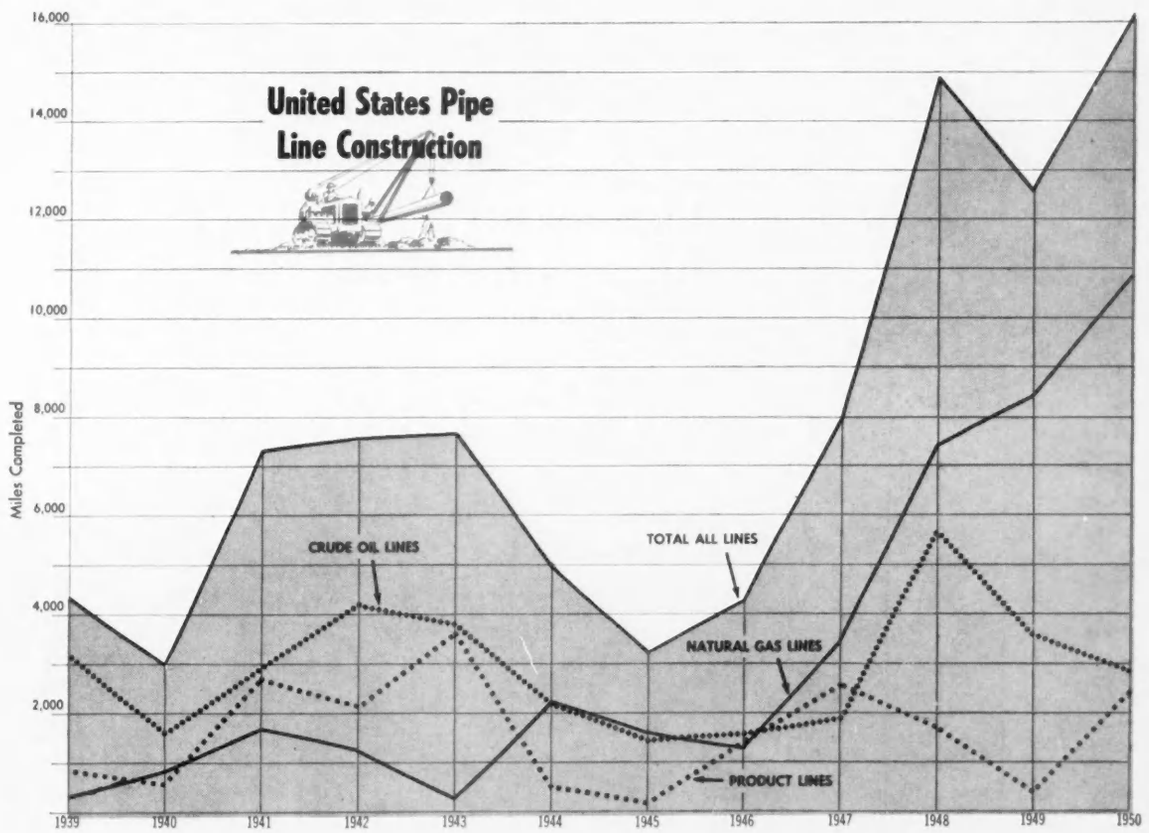
17,000 Miles of New U.S. Pipe Lines Expected During 1951

By SYLVIA LILLIE, Staff Writer

PIPE line construction in the U. S. reached an all-time peak in 1950 with 16,120 miles of line completed. This figure is more than 1000 miles higher than for 1948 —the previous record year—and indications are that 1951 will top 1950 by another 1000 miles.

Of this 16,120 miles, 10,854 miles were natural gas line, 2843 miles crude oil, and 2423 miles products. The cumulative total for the nation now stands at more than 450,000 miles, of which 292,000 are gas lines, and 158,000 crude and products.

Greatest increase for number of miles by pipe sizes was in the 30-inch and over category. In 1949 10.75 per-



YEAR	MILES OF NEW PIPE LINE PLACED IN OPERATION*				MILES OF LINE BUILDING OR AUTHORIZED AT YEAR END†			
	Oil	Product	Gas	Total	Oil	Product	Gas	Total
1950.....	2,843	2,423	10,854	16,120	5,366	3,288	23,934	32,588
1949.....	3,634	437	8,493	12,564	2,663	2,055	21,740	26,499
1948.....	5,669	1,738	7,414	14,821	4,779	42	15,323	20,144
1947.....	1,876	2,598	3,479	7,953	2,715	1,386	9,790	13,891
1946.....	1,610	1,404	1,271	4,285	2,099	2,638	4,771	9,508
1945.....	1,470	143	1,598	3,211	831	882	248	1,961
1944.....	2,219	518	2,224	4,961	112	....	286	398
1943.....	3,795	3,614	262	7,671	848	....	1,423	2,371
1942.....	4,200	2,100	1,250	7,550	1,147	428	140	1,715
1941.....	2,900	2,700	1,700	7,300	322	....	446	768
1940.....	1,615	575	810	8,000	457	450	243	1,150
1939.....	3,155	840	305	4,300	460	589	171	1,220

* Includes all lines completed during the year. † Mileage on all types of pipe lines on which construction was still underway at end of year, plus mileage of new lines authorized or planned.

cent of the total mileage was in this class; last year, due largely to Transcontinental Gas Pipe Line Corporation's 1840-mile 30-inch line, the percentage was 21.95. The large quantity of 12-inch completed by Great Lakes Pipe Line Company boosted the percentage in that category from 8.49 in 1949 to 17.89 in 1950. The 18-inch size showed a good increase too, mainly because there was very little 18-inch line built in 1949. On the other hand, there was considerably less 24-inch pipe used in 1950.

At the beginning of 1951 there were 32,588 miles of pipe line under construction, authorized by the Federal Power Commission, or in the planning stage. Proposed or building natural gas lines accounted for 23,934 miles, crude lines for 5366 miles, and products lines for 3288 miles. Much of this will not be completed this year. There is some duplication of proposed projects. Two companies want to build crude lines from the Permian Basin in Texas to California; three have applied to FPC for permission to give gas service to the Pacific Northwest; and the same situation exists in North Carolina and in New England. FPC will refuse to authorize many of the planned lines, and the Petroleum Administration for Defense may eliminate more by refusing to allocate necessary steel. Of those authorized or actually building, several are long interstate lines which

Mileage of Crude Oil, Products, and Natural Gas Pipe Lines in U. S. by States, as of January 1, 1950

Sources: Crude oil and refined products lines from U. S. Bureau of Mines Information Circular 7585, Oct., 1950; Natural Gas Lines from Gas Facts, 1949, of American Gas Ass'n, Page 62. Lines completed in 1950 from WORLD OIL records and do not include lines under 4-inch, lines less than 5 miles long, or natural gas distribution lines.

(MILES)

STATE	CRUDE OIL AND REFINED PRODUCTS					*NATURAL GAS MAIN				Total Crude Oil Products and Natural Gas
	Gathering Lines (Crude Oil; Natural Gasoline)	TRUNK LINES			Total Crude and Products (Gathering Trunk)	Field and Gathering	Trans-mission	Distri-bution	Total Natural Gas	
		Crude Oil	Refined Products	Total Trunks						
Alabama	.....	.....	284	284	284	.....	1,040	1,630	2,670	2,954
Arizona	.....	.....	.....	.....	.....	.....	1,730	1,690	3,420	3,420
Arkansas	718	809	254	1,063	1,781	100	3,110	3,060	6,270	8,051
California	1,976	3,259	1,013	4,272	6,248	270	3,600	28,460	32,330	38,578
Colorado	133	417	167	584	717	20	1,090	1,840	2,950	3,667
Connecticut	.....	.....	22	22	22	.....	.....	.....	.....	22
Delaware	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Florida	.....	.....	78	78	78	.....	40	140	180	258
Georgia	.....	.....	815	815	815	.....	320	1,820	2,140	2,955
Idaho	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Illinois	3,201	4,884	1,364	6,248	9,449	20	3,640	6,600	10,260	19,709
Indiana	389	2,557	711	3,268	3,657	150	1,910	3,000	5,060	8,717
Iowa	.....	104	1,223	1,327	1,327	.....	1,800	2,360	4,160	5,487
Kansas	6,265	4,018	2,092	6,110	12,375	1,920	10,300	5,190	17,410	29,785
Kentucky	786	211	6	217	1,003	1,960	2,100	1,570	5,630	6,633
Louisiana	1,627	2,459	544	3,003	4,630	930	4,340	4,330	9,600	14,230
Maine	.....	76	124	200	200	.....	.....	.....	.....	200
Maryland and D. C.	.....	.....	77	77	77	.....	150	2,000	2,150	2,227
Massachusetts	.....	.....	177	177	177	.....	.....	.....	.....	177
Michigan	715	928	129	1,057	1,772	460	2,460	9,030	11,950	13,722
Minnesota	.....	.....	974	974	974	.....	630	2,550	3,180	4,154
Mississippi	393	272	166	438	831	70	2,710	2,310	5,090	5,921
Missouri	.....	5,164	899	6,063	6,063	.....	2,040	5,020	7,060	13,123
Montana	523	319	.....	319	842	780	1,240	880	2,900	3,742
Nebraska	24	443	607	1,050	1,074	.....	2,390	2,240	4,630	5,704
Nevada	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Hampshire	.....	38	.....	38	38	.....	.....	.....	.....	38
New Jersey	.....	177	151	328	328	.....	100	320	420	748
New Mexico	1,618	594	.....	594	2,212	460	2,160	1,180	3,800	6,012
New York	480	230	536	766	1,246	530	2,630	3,740	6,900	8,146
North Carolina	.....	.....	111	111	111	.....	.....	.....	.....	111
North Dakota	.....	.....	81	81	81	20	280	140	440	521
Ohio	3,299	3,177	1,130	4,307	7,606	2,100	9,690	16,490	28,280	35,886
Oklahoma	9,245	8,447	1,137	9,584	18,829	2,250	4,890	5,600	12,740	31,569
Oregon	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pennsylvania	4,796	3,297	2,785	6,082	10,878	7,410	9,110	9,930	26,450	37,328
Rhode Island	.....	.....	13	13	13	.....	.....	.....	.....	13
South Carolina	.....	.....	102	102	102	.....	.....	.....	.....	102
South Dakota	.....	.....	182	182	182	.....	310	330	640	822
Tennessee	.....	.....	109	109	109	10	640	1,490	2,140	2,249
Texas	20,149	26,409	2,625	29,034	49,183	3,220	15,010	19,110	37,340	86,523
Utah	.....	287	.....	287	287	10	310	1,220	1,540	1,827
Vermont	.....	59	.....	59	59	.....	.....	.....	.....	59
Virginia	.....	.....	.....	.....	.....	.....	230	880	1,110	1,110
Washington	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
West Virginia	3,660	580	7	587	4,247	8,080	4,480	4,090	16,650	20,897
Wisconsin	.....	.....	.....	.....	.....	.....	400	1,550	1,950	1,950
Wyoming	563	2,158	186	2,344	2,907	90	1,390	560	2,040	4,947
Total U. S., Jan. 1, 1950	60,560	71,373	20,881	92,254	152,814	30,860	98,270	152,350	281,480	434,294
Completed in 1950	.....	.....	.....	.....	5,266	.....	.....	.....	10,854	16,120
Total U. S., End of 1950	.....	.....	.....	.....	158,080	.....	.....	.....	292,334	450,414

* Includes Field, Gathering Transmission, and Distribution Main, but excludes service pipe. Data not adjusted to a common diameter equivalent.

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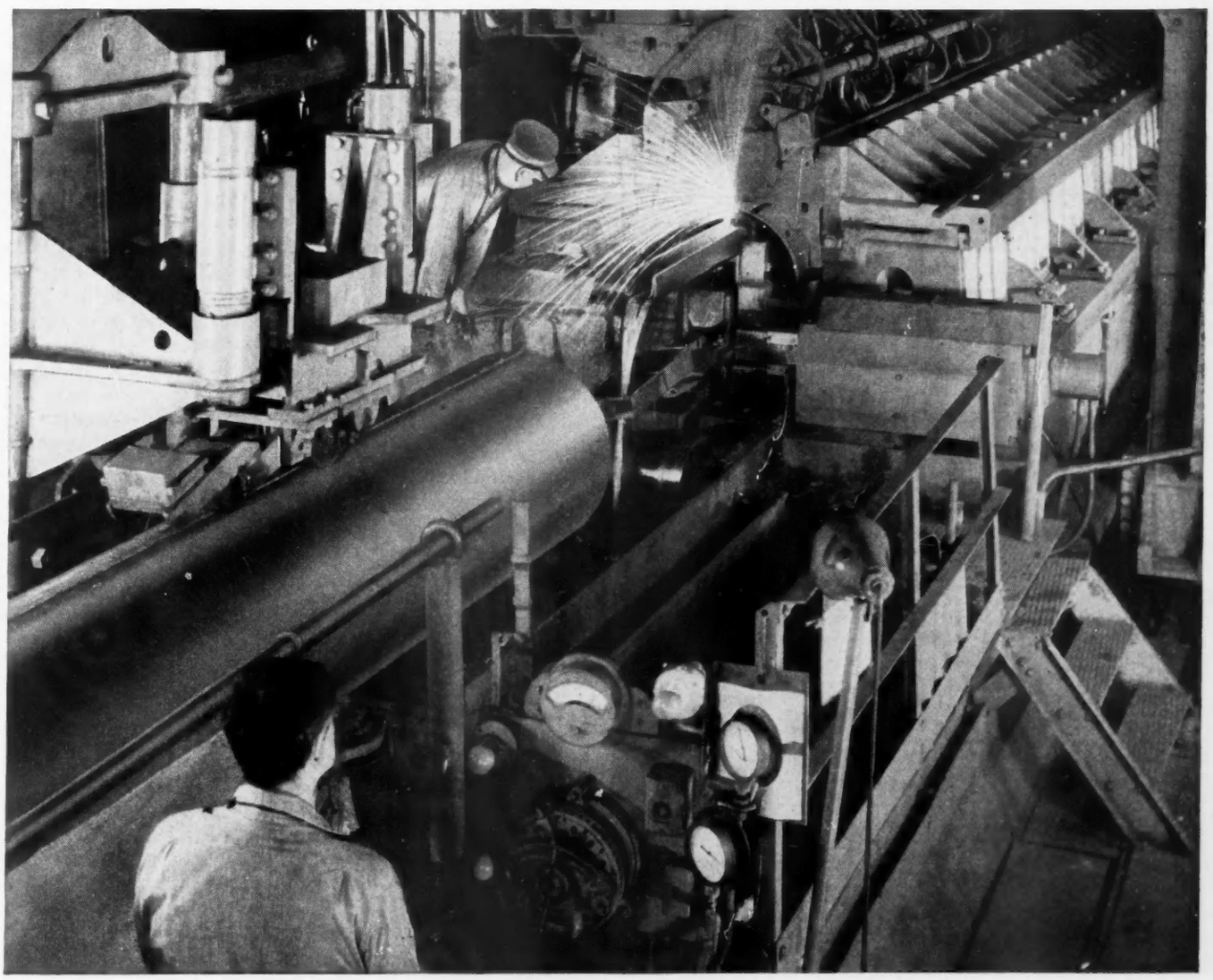

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LINE PIPE • CASING

will not see completion in 1951. About 17,000 miles of new line will be laid this year. A serious steel shortage would, of course, upset this estimate.

The longest crude carrier reaching completion last year was Mid-Valley Pipeline Company's 1000-mile, 20- and 22-inch line from Longview in East Texas to Lima, Ohio. The line is jointly owned by Sun Oil Company and The Standard Oil Company (Ohio), and will supply their Ohio refineries with crude from Texas, Arkansas, Louisiana, and Mississippi.

Humble Pipe Line Company put into operation 371 miles of 18-inch crude line from Kemper, West Texas, to Satsuma, Harris County, from where it will be moved to Humble's Baytown refinery. Portland Pipe Line Corporation and Montreal Pipe Line Company completed a 236-mile, 18-inch line to move Venezuela crude, brought to Portland by tanker, to refineries in Montreal, Canada.

A 362-mile line under construction by The Ohio Oil Company starts at Wood River, line will go through Patoka, Ill., a junction point of several lines, and Martinsville, Ohio, where it will connect with other Ohio Oil Company lines.

Platte Pipe Line Company has completed plans for a 1078-mile crude line from Worland, Wyo., to the Wood River refining area, providing an increased outlet for crude from the Rocky Mountains and, if necessary, from Canada.

Two pipe line companies were formed in 1950 to build crude lines from the Texas Permian Basin to Los Angeles. West Coast Pipeline Company is made up of about 50 independent operators seeking an oil outlet. They point out that the line, which will be 20-inch, could be used for transporting products. Progress Pacific Pipe Line Company plans a 10-inch products line in addition to the 24-inch crude line. In all three lines the flow could be reversed in the event California refineries were destroyed.

Plans were announced late in 1950 for the construction of another outlet for West Texas Crude. Gulf Oil Corporation, Cities Service Company, The Pure Oil Company, Sun Oil Company, and Standard Oil Company of Ohio expect to build 440 miles of 24- and 26-inch with a capacity of 300,000 barrels per day out of West Texas. Part of the crude will be taken to the Beaumont-Port Arthur refining district, and part to Sohio's refinery at Lima via Mid-Valley's system.

Sinclair Pipe Line Company plans a 700-mile, 22-inch line from Drumright, Okla., to Chicago, connecting near Cushing with mid-Continent lines and thus relieving the pressure on Texas and Oklahoma areas.

Pipe Sizes of Lines Laid in U. S. During 1950 and 1949

Nominal Pipe Size (Inches)	Miles Completed		Percent of Year's Total	
	1950	1949	1950	1949
4	365	547	2.26	4.35
6	978	602	6.07	4.79
8	1,335	998	8.28	7.94
10	860	974	5.34	7.75
12	2,884	1,067	17.89	8.49
14	285	329	1.77	2.63
16	676	527	4.19	4.20
18	1,278	244	7.93	1.94
20	1,391	953	8.63	7.59
22	832	1,169	5.16	9.30
24	209	2,225	1.30	17.71
26	1,488	1,579	9.23	12.57
30 and Over	3,539	1,350	21.95	10.75
	16,120	12,564	100.00	100.00

Products Lines

In 1949, 437 miles of products lines were built; in 1950, there were 2423. Great Lakes Pipe Line Company construction was responsible for the greater part of this increase. Great Lakes completed 1262 miles, including a line from Tulsa to Saint Paul, and one from Kansas City to Sioux Falls, S. D. The only other products completion of any length was Salt Lake Pipe Line Company's 240-mile extension to its Salt Lake-Boise line. The terminus is now Pasco, Wash.

Even more products construction is scheduled for 1951. Tuscarora Oil Company is replacing its 360-mile line between Linden, N. J., and Pittsburgh with 10- and 12-inch pipe. Work has already begun, but the entire project is not expected to be finished until 1952. Plantation Pipe Line Company has let contracts for 707 miles between Baton Rouge, La., and Charlotte, N. C. Penn-York Pipe Line Company plans to start in March 410 miles from Philadelphia and New York to Binghamton, Syracuse, and Rochester. Longest of the proposed lines is a 965-mile common-carrier from the Houston-Beaumont area to Saint Louis and Chicago, to be built by United States Pipe Line Company.

Natural Gas Line

Highlight of all 1950 construction was the completion of Transcontinental Gas Pipe Line Corporation's 1840-mile line from the gas fields of the Texas Rio Grande valley to metropoliton New York. Most of the main line is 30-inch pipe. Approximately 450 miles of smaller gathering and sales laterals were built this year. Initial capacity of the system is 340 Mmcf, but Transcontinental has been authorized by FPC to increase its capacity to 555 Mmcf. Fish Constructors, Inc., Houston, did the engineering and let the contracts for the project. According to their latest estimate construction cost was $250 million.

Pacific Gas & Electric Company's recently-completed 506-mile, 34-inch line from Needles, Calif., to Pacific's Milpitas terminal has the distinction of being the largest-diameter gas line ever built. Its capacity, now 250 Mmcf, will be increased to 400 Mmcf.

Texas Illinois Natural Gas Pipe Line Company got its 1331-mile line under way in August. Mainly of 26- and 30-inch pipe, it takes gas from the La Gloria, Old Ocean, and Chocolate Bayou fields of Texas to Joliet, Ill. Authorized capacity is 305 Mmcf, with an application pending for permission to increase to 374 Mmcf. Fish Pipe Line Construction Company has the master contract for the system, which will be completed in 1951.

Another project to take Gulf Coast gas to the Mid-Continent area is in the building stage. Trunkline Gas Supply Company will take 250 Mmcf of gas to Illinois, largely for delivery to Panhandle Eastern Pipe Line Company. Trunkline's main line, all 26-inch, will stretch 740 miles from Longville, La., to Joppa, Ill. Also under way are 560 miles of smaller supply laterals to Texas and Louisiana fields.

Pacific Northwest Pipeline Corporation plans a line that would succeed Transcontinental as the nation's longest. The trunk line, 2175 miles long and of 26-inch pipe, would supply gas from the Texas Upper Gulf Coast to Washington and Oregon cities and to Vancouver, B. C. In addition there would be 400 miles of 22-inch and smaller gathering and distribution laterals. The line would have an initial capacity of 250 Mmcf out of Texas and would take 100 Mmcf from Alberta gas fields near the Alberta-Idaho border. There is a possibility that Texas gas would be taken out of the line along the route and sent to Ontario in quantities equal to those taken out of Alberta. Pacific Northwest is competing for this market with two Canadian companies, Northwest Natural Gas Company, and Westcoast Transmission Company, who want to supply Washington and Oregon with Alberta gas.

Still another line has been proposed to take Gulf Coast gas north and east. This one would tap a new source of supply—the offshore fields of Texas and Louisiana. Valley Gas Pipe Line Company would build 1440 miles of 24- and 30-inch from Goliad County, Texas, and the Vermilion Bay area of Louisiana to serve markets in Indiana, Ohio, and Michigan.

Texas Eastern Transmission Corporation is seeking authority to lay a 791-mile, 30-inch line from Kosciusko, Miss., to Texas Eastern's existing system near Connellsville, Penn.

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Crude Oil Pipe Line Activity in 1950

Arkansas

Pan-Am Southern Corporation completed seven miles of eight-inch loop on a six-inch line between Schuler and El Dorado.

California

Richfield Oil Corporation completed 115 miles of 14-inch between Wilmington and Wheeler, and 40 miles of ten-inch between Wheeler and Cuyama Valley field. Alex Robertson Company, Bakersfield, was contractor on the 80 miles from Wilmington to Newhall.

Illinois

Globe Oil Refining Corporation completed five miles of 12-inch near Lemont. O. R. Burden Construction Corporation, Tulsa, was contractor.

The Ohio Oil Company is building 362 miles between Wood River and Lima, Ohio. Bechtel Corporation, San Francisco, is at work on 54 miles of 20-inch from Wood River to Patoka, and Conyes Construction Corporation, San Pablo, Calif., is building 172 miles of 20- and 22-inch from Vandalia to Ohio's Harlos Gate plant near Sheridan, Ind.

Texas-Empire Pipe Line Company completed 42 miles of 16-inch loop line between Wilmington and Gary, Ind. O. R. Burden Construction Corporation, Tulsa, was the contractor.

Texas Pipe Line Company completed 42 miles of 12-inch from Patoka to Clay City. L. R. Young Construction Company, Olney, was the contractor.

Louisiana

Interstate Oil Pipe Line Company completed six miles of four-inch gathering system in Athens field, Claiborne Parish. J. C. Moore, Magnolia, Ark., was the contractor.

Interstate Oil Pipe Line Company completed eight miles of three- and four-inch line from Humble Oil & Refining Company's gasoline plant at Opelousas to Interstate's line near Sunset. Townsend Construction Company, Bunkie, was the contractor.

Magnolia Pipeline Company completed 30 miles of four- through ten-inch gathering system at Holly Beach and Mud Lake. J. R. Stewart Construction Company, Houston, was the contractor.

Pelican Oil Purchasers, Inc., completed 55 miles of six-inch in the vicinity of Sulphur. Anderson Bros. Corporation, Houston, was the contractor.

Maine

Portland Pipe Line Corporation completed 166 miles of 18-inch from Portland to the Canadian border at North Troy, Vt. Oklahoma Contracting Company, Dallas, built 85 miles between Portland and Gorham, N. H., and Associated Pipe Line Contractors, Inc., Houston, built the remaining 81 miles. A 70-mile stretch from the border to Montreal was built for Montreal Pipe Line Company by Fred Mannix & Company, Ltd., Calgary, Alberta.

Michigan

Naph-Sol Refining Company completed a 12-mile, four-inch line from Paris field, Mecosta County, to Woodville. L. R. Young Construction Company, Olney, was the contractor.

Naph-Sol Refining Company completed 26 miles of six-inch between Kimbell field, Newaygo County, and Muskegon. L. R. Young Construction Company was the contractor.

Minnesota

Lakehead Pipe Line Company completed 360 miles of 18-inch from Gretna, Manitoba, to Superior, Wis. Anderson Bros. Corporation, Houston, was the contractor. This forms the last lap of a 1150-mile line from Edmonton, Alberta, to Superior, Wis. The Canadian portion was built by Interprovincial Pipe Line Company.

Mississippi

Gulf Refining Company plans construction of a 200-mile, 16-inch line from the Heidelberg-Eucutta district of Jasper County to Mobile, Ala., via Baxterville field.

Interstate Oil Pipe Line Company completed seven miles of four-inch gathering line in Bude field, Franklin County. Clyde A. Hust, Laurel, was the contractor.

New Mexico

Basin Pipe Line System plans to increase the capacity of its line between Colorado City and Wichita Falls, Texas, from 250,000 to 350,000 barrels per day, and between Wichita Falls and Cushing, Okla., from 270,000 to 385,000 bpd. Four new booster stations and additional tankage at Colorado City will be installed.

Ohio

Buckeye Pipe Line Company completed a 23-mile, eight-inch line between Sylvania and Monroe, Mich. Bills & Troth Construction Company, Tulsa, was the contractor.

Oklahoma

Ozark Pipe Line System plans to increase its capacity 68,000 barrels per day by building five pump stations at Wildhorse and Fairland, Okla., and Lawrenceburg, Swedeborg, and Labadie, Mo.

Sinclair Pipe Line Company is planning a 700-mile, 22-inch line from Drumright to Chicago. The line, including six pump stations, will cost $48 million and will have a capacity of 145,000 bpd.

East Texas

American Petroleum Company completed 11 miles of eight-inch between Sour Lake and Arriola. Latex Construction Company, Houston, was the contractor.

Mid-Valley Pipeline Company completed a 1000-mile, 20- and 22-inch line from Longview to Lima, Ohio. Sixty-nine miles of 20-inch from Longview to Benton were built by O. R. Burden Construction Corporation, Tulsa; 41 miles of 20-inch from Benton to Haynesville, La., by Latex Construction Company, Houston; 120 miles of 20-inch from Haynesville to Mayersville, Miss., by Latex Construction Company; 111 miles of 22-inch from Mayersville to Oakland, Miss., by Associated Pipe Line Contractors, Inc., Houston; 111 miles of 22-inch from Oakland to Henderson, Tenn., by Houston Contracting Company, Houston; 111 miles of 22-inch from Henderson to Clarksville, Tenn., by Eastern Construction Company, Dallas; 111 miles of 22-inch from Clarksville to Elizabethtown, Ky., by Britton Construction Company, Fort Worth; 111 miles of 22-inch from Elizabethtown to Hebron, Ky., by H. L. Gentry Construction Company, Jackson, Miss.; 120 miles of 20-inch from Hebron to Lima, Ohio, by Mahoney Construction Company, Mount Pleasant, Mich.

Sun Pipe Line Company completed a 16-mile, six-inch line from Nona Mills field, Hardin County, to Saratoga. Joe Titsworth, Kilgore, Texas, was the contractor.

North Texas

The Texas Pipe Line Company is building 56 miles of 12-inch from Chico station in Wise County to Wichita Falls. R. H. Fulton & Company, Lubbock, Texas, started in November.

Southwest Texas

Continental Oil Company is building 40 miles of two- through eight-inch gathering system in Albert West field, Live Oak County. F. M. Reising, Edinburg, is the contractor.

Texas Panhandle

Amarillo Oil Company built 12 miles of ten- and 12-inch across the Canadian River north of Amarillo. Brodie Construction Company, Amarillo, was the contractor.

Phillips Pipe Line Company will build 281 miles of ten-inch from Borger to Yale, Okla. This will bridge the gap between existing lines and will make it possible to move West Texas and Panhandle crude to Phillips refineries at Kansas City and Okmulgee, Okla.

Upper Texas Coast

Magnolia Petroleum Company completed 60 miles of four- through 24-inch gathering system in La Ward and Lolita Fields. Henry L. Lemons & Company, Corpus Christi, was the contractor.

Ohio Oil Company completed 20 miles of three- through ten-inch gathering line in North Markham field. Sheppard & Geiger Construction Company, Corpus Christi, was the contractor.

Phillips Petroleum Company completed 55 miles of six- and eight-inch from Sweeny to Humble's station at Webster. O. R. Burden Construction Corporation, Tulsa, was the contractor.

West Texas

Gulf Oil Corporation, Cities Service Company, The Pure Oil Company, Sun Oil Company, and Standard Oil Company of Ohio plan to build 440 miles of 24- and 26-inch line to carry West Texas crude to the Gulf Coast. The 26-inch portion, with a capacity of 300,000 barrels per day, will run from Colorado City, Mitchell County, to Wortham, Freestone County. A 24-inch line will carry some of the crude to Sour Lake, near the Beaumont-Port Arthur refining district, while the remainder will be fed into Mid-Valley Pipe Line Company's system at Longview and moved to the Sohio refinery at Lima, Ohio.

Gulf Refining Company completed a 30-mile, eight- and ten-inch line from Roscoe station to Snyder, Scurry County. Latex Construction Company, Houston, was the contractor.

Humble Pipe Line Company completed a 371-mile, 18-inch line from Kemper to Satsuma. Morrison Construction Company, Inc., Austin, built 178 miles from Kemper to Eckert, and Anderson Bros. Corporation, Houston, built the remaining 193 miles.

Humble Pipe Line Company completed a 32-mile, eight-inch line from Fort Chadbourne field to its Ballinger station. Morrison Constructors, Odessa, was the contractor.

Magnolia Pipe Line Company finished 22 miles of eight-inch in Howard and Scurry counties. Shanks & Eustace, Alice, was contractor.

Magnolia Pipe Line Company completed 50 miles of 12-inch in four loops between Colorado City and Hillsboro. Bishop & Lock Construction Company, Dallas, was the contractor.

Pan American Pipe Line Company completed 80 miles of ten-inch from southern Scurry County to Humble Pipe Line Company's system at San Angelo. Brown & Root, Inc., Houston, was contractor.

Pan American Pipe Line Company completed 23 miles of four- and six-inch gathering system in the vicinity of Snyder. W. L. Golightly Construction Company, Houston, was the contractor.

Progress Pacific Pipe Line Company is seeking the approval of Petroleum Administration for Defense of a 1050-mile, 24-inch line from West Texas to Long Beach, Calif., paralleled by a ten-inch products line. Capacity of the crude line would be 250,000 barrels per day, of the products line, 65,000. Estimated cost of the entire project is $120 million.

Shell Pipe Line Corporation completed 40 miles of ten-inch between Shell's terminal at McCamey and Humble's terminal at Kemper. McVean & Roberts, Odessa, was the contractor.

Stanolind Pipe Line Company completed a 36-mile, eight-inch line from its Post pumping station in Garza County to Cogdell field, Kent County. Smith Contracting Corporation, Fort Worth, was the contractor.

Texas-New Mexico Pipe Line Company announced plans for the construction of 37 miles of ten-inch from Basin Pipe Line Company's Colorado City station into southwestern Kent County. Sixteen miles from Colorado City to lines extending from Diamond "M" and Sharon Ridge pools in Scurry County have been completed by O. R. Burden Construction Corporation, Tulsa.

West Coast Pipeline Company plans to build 1100 miles of 20-inch from Monahans, in the Permian Basin, to Los Angeles. The line, with a capacity of 200,000 barrels per day, could be used for products if necessary.

Wyoming

General Petroleum Corporation completed 14 miles of four-inch between Gooseberry field and Grass Creek field.

Ohio Oil Company is planning 22 miles of 12-inch from Elk Basin field to Byron.

Platte Pipe Line Company is planning to build a 1078-mile line from Worland to Wood River, Ill. The 140 miles from Worland to Casper will be 16-inch and 938 miles from Casper to Wood River will be 20-inch.

Service Pipe Line Company completed 32 miles of three- through eight-inch from Beaver Creek field to its Lost Cabin line. Vaughn & Taylor Construction Company, Inc., Wichita Falls, Texas, was contractor.

it isn't a plug –
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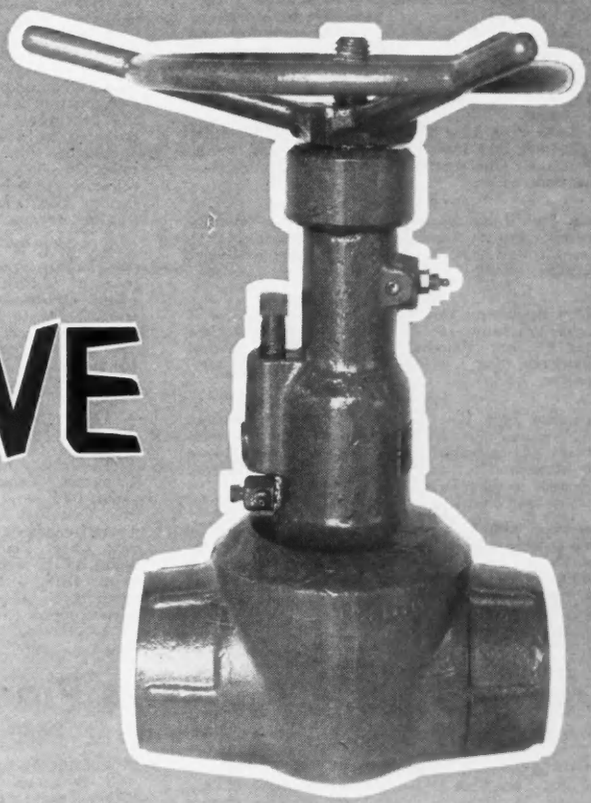

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Products Pipe Line Activity in 1950

Arkansas

Triangle Pipe Line Company plans to build 100 miles of ten-inch to extend its Carthage-El Dorado line to the Mississippi River.

Colorado

Phillips Petroleum Company completed 155 miles of six-inch between La Junta and Denver. Cheek Construction Company, Ulysses, Kansas, was the contractor.

Idaho

Salt Lake Pipe Line Company completed a 240-mile line from Boise to Pasco, Wash. Morrison-Knudsen Company, Inc., Macco Corporation, and Bechtel Corporation, San Francisco, built 120 miles of eight-inch from Boise to Baker, Ore., and Pacific Pipeline & Engineers, Ltd., San Francisco, built 120 miles of six-inch from Baker to Pasco.

Salt Lake Pipe Line Company finished a 63-mile, eight-inch line from Mountain Home to Boise. Oklahoma Contracting Corporation, Dallas, was the contractor.

Illinois

Texas Pipe Line Company will build a 56-mile, ten-inch line between Lawrenceville and Mount Vernon, Ind. O. R. Burden Construction Corporation, Tulsa, has the contract.

Kansas

Phillips Petroleum Company completed 18 miles of eight-inch loop line in the vicinity of Ottawa and Olathe. Vaughn & Taylor Construction Company, Inc., Wichita Falls, was the contractor.

Louisiana

Plantation Pipe Line Company awarded contract to Williams Bros. Corporation, Tulsa, to construct 432 miles of 18-inch from Baton Rouge to Bremen, Ga., and 275 miles of 14-inch from Bremen to Charlotte, N. C.

New Jersey

Tuscarora Oil Company, Ltd., is replacing its 360-mile line between Linden, N. J., and Pittsburgh with 10- and 12-inch pipe. Four large pumping stations will replace nine old ones, and the present capacity of 25,000 barrels per day will be raised to 45,000 with a potential of 80,000. Pipeline Construction & Drilling Company, Camp Hill, Penn., built 50 miles of ten-inch in the vicinity of Ebensburg, Penn., and 56 miles of 12-inch between Reading and Harrisburg, Penn. The program is to be completed in 1952.

Ohio

Essaness Corporation (Sohio Petroleum Company and Shell Oil Company) completed a 57-mile, eight-inch line from Springfield to Lima. Tulsa Construction Company, Inc., Tulsa, was the contractor. Essaness will acquire Shell's Springfield-Columbus line and Sohio's Springfield-Dayton and Lima-Toledo lines.

Miami Valley Corporation (Sohio and The Pure Oil Company) built a 58-mile, eight-inch line from Cincinnati to Dayton. Ohio Pipe Line Construction Company, Inc., Indianapolis, was the contractor. A pump station at Dayton is operated by Sohio.

Susquehanna Pipe Line Company completed 125 miles of eight-inch from Sun Oil Company's refinery at Toledo to Sarnia, Ontario. H. L. Gentry Construction Company, Jackson, Mich., was the contractor.

Oklahoma

Great Lakes Pipe Line Company completed 663 miles of 12-inch between Tulsa and Saint Paul, Minn. Contracts were let as follows: 236 miles from Tulsa to Kansas City were built by Engineers Limited Pipeline Company, Los Angeles; 190 miles from Kansas City to Des Moines, Iowa, were built by Trojan Construction Company, Inc., Oklahoma City, Brodie Construction Company, Amarillo, Texas, and R. H. Fulton & Company, Lubbock, Texas; 112 miles from Des Moines to Mason City, Iowa, were completed by O. R. Burden Construction Corporation, Tulsa, and A. C. Holder Construction Company, Tulsa; 125 miles from Mason City to Saint Paul were laid by A. C. Holder Construction Company and Sheehan Pipe Line Construction Company, Tulsa.

Great Lakes Pipe Line Company completed 165 miles of 12-inch between Irvington, Neb., and Sioux Falls, S. D. Forty-seven miles from Irvington to Decatur, Neb., were built by Trojan Construction Company, Oklahoma City; 42 miles from Decatur to Sioux City, Iowa, by A. C. Holder Construction Company, Tulsa; 38 miles from Sioux City to Hawarden, Iowa, by G. G. Griffis Construction Company, Tulsa; and 39 miles from Hawarden to Sioux Falls by Midwestern Constructors, Inc., Tulsa.

Great Lakes Pipe Line Company completed a 193-mile, 12-inch line from Barnsdall to Kansas City paralleling a recently-completed 12-inch line and three eight-inch lines. Forty-eight miles from Barnsdall to Independence, Kansas, were built by Sparling, Fowler, Murphy Company, Inc., Bartlesville; 50 miles from Independence to Humboldt, Kansas, by Engineers Limited Pipeline Company, San Francisco; 53 miles from Humboldt to Paola, Kansas, by A. C. Holder Construction Company, Tulsa; 42 miles from Paola to the Kaw River near Kansas City by Engineers Limited Pipeline Company.

Great Lakes Pipe Line Company completed a 54-mile, 12-inch line between Ponca City and Barnsdall, Okla. A. C. Holder Construction Company, Tulsa, was the contractor.

Great Lakes Pipe Line Company completed 45 miles of eight-inch from Cushing to Tulsa. Trojan Construction Company, Oklahoma City, was the contractor.

Great Lakes Pipe Line Company completed 142 miles of 12-inch from Atchison, Kansas, to Omaha, Neb. Midwestern Constructors, Inc., Tulsa, was the contractor.

Pennsylvania

Penn-York Pipe Line Company plans to start in March 410 miles of 10- and 14-inch. Two lines will run from Philadelphia and New York to the Allentown-Scranton area, and a single line north to Binghamton, Syracuse and Rochester.

Upper Texas Coast

Dow Chemical Company completed a 66-mile, six-inch line between Freeport and Katy. Barry Construction Company, Houston, was contractor.

Shell Pipe Line Corporation completed 19 miles of four-inch between Englehart field and Provident City.

United States Pipe Line Company plans to start early in 1951 a 965-mile common-carrier from the Houston-Beaumont refining area to St. Louis and Chicago.

Natural Gas Pipe Line Activity in 1950

Alabama

Alabama-Tennessee Natural Gas Company completed 35 miles of eight-inch between Muscle Shoals and Decatur. Lehman, Hoge & Scott, Harlingen, Texas, was the contractor. Alabama-Tennessee plans to extend this line 26 miles to Huntsville.

City of Florence is building 84 miles of one-through eight-inch distribution line in the city. Modern Welding Company, Owensboro, Ky., is the contractor.

South Central Alabama Natural Gas Company, Inc., has application before FPC for permission to build a 150-mile line to serve southeastern Alabama municipalities from Southern Natural Gas Company's line in Elmore County.

Arizona

Nevada Natural Gas Pipe Line Company applied for permission to build 114 miles of ten-inch and seven miles of four-inch from the east bank of the Colorado River near Topock north to Las Vegas, Nev. Gas will be taken from El Paso Natural Gas Company and sold to distributing companies in Needles, Calif., and Boulder City and Las Vegas, Nev.

Arkansas

Arkansas Power & Light Company will build a 30-mile, 12-inch line from Forest City to Helena. Tulsa Construction Company has been awarded the contract.

Crossett Lumber Company has asked permission to construct a 30-mile, eight-inch line to bring gas to its plant at Crossett from Arkansas Louisiana Gas Company's line in Union County, Ark. Arkansas Louisiana will operate the line.

Mid-South Gas Company asked FPC authorization to build 240 miles of pipe to carry gas to 21 communities in northwest Arkansas. Plans include the acquisition from Arkansas Power & Light Company of 26 miles of main line plus distribution systems in 20 towns in eastern Arkansas.

California

Coast Counties Gas & Electric Company completed ten miles of ten-inch between Watsonville and Gilroy. M. G. M. Construction Company, Concord, was the contractor.

Pacific Gas & Electric Company completed a 506-mile, 34-inch line from El Paso Natural Gas Company's facilities at Needles to Pacific's Milpitas terminal. Pacific has authority to increase capacity of the line (now 250 Mmcf) to 400 Mmcf. Bechtel-Price-Conyes, San Francisco, was the contractor.

Southern California Gas Company completed 80 miles of 30-inch loop between Whitewater and Puente, increasing the capacity of its Texas-California line from 305 to 405 Mmcf. Midwestern Constructors, Inc., Tulsa, Johnson Western Gunite Company, San Pedro, and L. E. Dixon Company, San Gabriel, were contractors.

Southern Counties Gas Company completed five miles of four-inch from Santa Monica to Malibu Beach. Signal Pipe Line Construction Company, Los Angeles, was the contractor.

Colorado

City of Trinidad has FPC permission to build 35 miles of eight-inch connecting the city with Colorado Interstate Gas Company's facilities. A distribution system will be built in Trinidad.

Colorado-Wyoming Gas Company completed a 27-mile, ten-inch loop from Boulder Junction to Mesa station. Vaughn & Taylor Construction Company, Inc., Wichita Falls, Texas, was contractor.

Grand Valley Pipeline Company plans a 60-mile line to carry gas from Pinceance Creek field to Grand Junction and other communities along the Colorado River.

Connecticut

Northeastern Gas Transmission Company has been given FPC authorization to build 511 miles of line to serve markets in Massachusetts, Connecticut, and New Hampshire.

Northeastern Gas Transmission Company has applied for permission to extend its authorized system to provide service to all New England towns and communities which Algonquin Gas Transmission Company proposes to serve, and to a number of additional communities in Massachusetts, eastern New Hampshire, and Maine. It would build approximately 441 miles of additional lines and an 800-hp compressor station. The proposed system would have a delivery capacity of 414 Mmcf. Northeastern has also asked FPC approval of the substitution of 24-inch pipe for the 20-inch previously authorized on the 144 miles of the main system between the New York-Massachusetts state line near Pittsfield, Mass., and Boston.

Delaware

Delaware Power and Light Company completed ten miles of 12-inch from the Delaware-Pennsylvania line to Wilmington. George & Lynch, Wilmington, was the contractor.

Georgia

Georgia Natural Gas Company asked for permission to build a 335-mile line from Southern Natural Gas Company's facilities near Phenix City, Ala., to Tallahassee.

South Georgia Natural Gas Company has an application pending for permission to construct a 527-mile line from Southern Natural's system in northern Georgia into Florida. The proposed line may be connected with Transcontinental Gas Pipe Line Corporation's line, in which case an additional 53 miles of pipe will be required.

Illinois

Egyptian Natural Gas Company has FPC authorization to build 40 miles of eight-inch from Norris City to Mount Vernon, and 40 miles of six-inch from Mount Vernon to Centralia and Salem.

Illinois Gas Company is building 18 miles of six-inch and 12 miles of eight-inch in the vicinity of Olney. L. R. Young Construction Company, Olney, is the contractor.

Interstate Power Company applied for authority to build 26 miles of eight-inch from a connection with the facilities of Natural Gas Pipeline Company of America near Hooppole to Clinton, Iowa.

Indiana

Citizen's Gas & Coke Utilities Company is building 26 miles of 16-inch from Panhandle Eastern Pipe Line Company's main line near Zionsville to Indianapolis. Williams Bros. Construction Company, Tulsa, is the contractor.

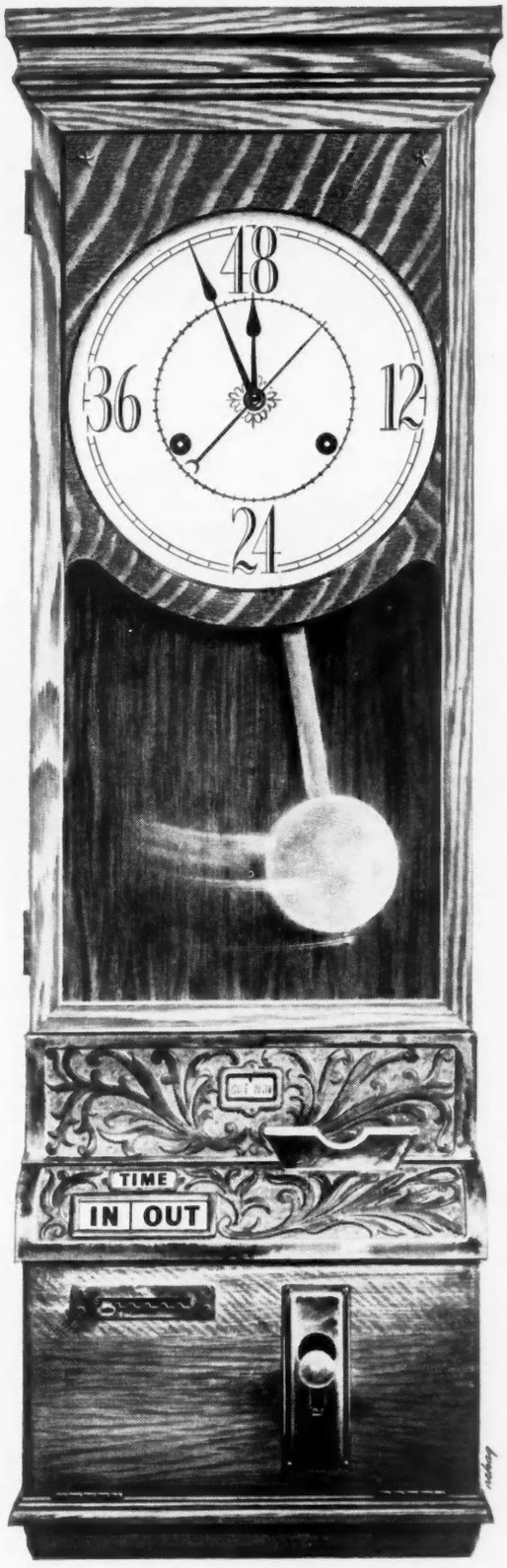
Northern Indiana Fuel & Light Company asked FPC authority to build 31 miles of eight-inch to serve communities in northeastern Indiana from a connection with Panhandle Eastern Pipe Line Company's line.

Southern Indiana Gas & Electric Company is building 12 miles of 12-inch in the Evansville area. L. R. Young Construction Company, Olney, Ill., is the contractor.

Iowa

Northern Natural Gas Company completed 37 miles of ten-inch between Ames and Marshalltown. Knupp Construction Company, Inc., Great Bend, Kansas, was the contractor.

Northern Natural Gas Company is building 25



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Electric Resistance and Fusion Weld—Plain End	8⅝" to 22" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser
Electric Resistance Weld—Plain End	5⅝" to 12¾" O.D.	Up to 55'	.188" to .400"	Fontana, Calif.
Electric Fusion Weld—Expanded—Plain End	24" to 30" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser

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miles of six-inch near Lohrville, and six miles of eight-inch near Fort Dodge. Bills & Troth Construction Company, Tulsa, is doing the work.

Kansas

Cities Service Gas Company completed 50 miles of four- to ten-inch gas line in Grant and Stanton Counties. J. E. Carlson & Sons, Pampa, Texas, was the contractor.

Hugoton Production Company completed 14•miles of four- to ten-inch in the Hugoton field. Reese Bros. Construction Company, Hugoton, Kansas, was the contractor.

Kansas Nebraska Natural Gas Company has FPC authorization to increase its capacity in Kansas and Nebraska to approximately 146 Mmcf by replacing 47 miles of line with larger pipe, by building six miles of 12-inch loop on an existing 12-inch line southwest from Palco, and by installing 1640 horsepower in existing stations.

Northern Natural Gas Company completed 442 miles of 26-inch and 155 miles of 20-inch loop line between the Texas Panhandle and Minnesota. Loop 1—40 miles of 26-inch northward from a point 29 miles north of Skellytown, Texas; Loop 2—75 miles of 26-inch from the Beaver, Okla., station; Loop 3—33 miles of 26-inch from the Mullinville station; Loop 4—73 miles of 26-inch from Bushton to Concordia; and Loop 5—155 miles of 20-inch from Garden City to Bushton, were built by R. H. Fulton & Company, Lubbock, Texas. Loop 6—43 miles of 26-inch from a point 29 miles northeast of Palmyra, Neb., to Oakland, Iowa; and Loop 7—66 miles of 26-inch northward from Oakland, were built by Midwestern Constructors, Inc., Tulsa. Loop 8—31 miles of 26-inch southwest from Ventura, Iowa; Loop 9—41 miles of 26-inch northward from Ventura; and Loop 10— 40 miles of 26-inch beyond Loop 9, were built by Mary Construction Company, Cape Girardeau, Mo.

Northern Natural Gas Company completed 99 miles of four- through ten-inch in the vicinity of Ulysses, Hugoton, and Garden City, Kansas. Reese Bros. Construction Company, Hugoton, was the contractor.

Northern Natural Gas Company completed 63 miles of four-, six- and 12-inch gathering lines in the Hugoton field. Cheek Construction Company, Ulysses, Kansas, was the contractor.

Northern Natural Gas Company completed 24 miles of 20- and 24-inch between Sublette and Plains Natural Gas Company's system in the Hugoton field. R. H. Fulton & Company, Lubbock, Texas, was the contractor.

Northern Natural Gas Company completed 44 miles of four- through 12-inch gathering system in the vicinity of Garden City. R. H. Fulton Company, Lubbock, was the contractor.

Phillips Petroleum Company is building 39 miles of eight-inch and 11 miles of ten-inch loops between Lyons and Kansas City. C. H. Gragg Construction Company, Britton, Okla., is the conrtactor.

Kentucky

Central Kentucky Natural Gas Company completed a 41-mile, 20-inch loop from North Means to Foster which will raise the capacity of the system from 191,500 mcf to 229,500 mcf. Williams-Austin Company, Pittsburgh, was the contractor.

Madison Utilities Corporation has FPC authorization to build eight miles of four-inch to connect its system with Tennessee Gas Transmission Company's main line in Carroll County.

Louisiana

Arkansas-Louisiana Gas Company completed 21 miles of eight-inch between East Haynesville field and Arkansas Fuel Oil Company's gas-treating plant in Columbia County, Ark. Snelling Company, Shreveport, was the contractor.

Arkansas-Louisiana Gas Company has been authorized to install 7000 hp in its Blanchard compressor station, to bring the capacity up to 109 Mmcf.

Atlantic Gulf Gas Company asked FPC to approve construction of a 1731-mile line from Eastern Louisiana to Georgetown, S. C., with a branch from Albany, Ga., to Jacksonville, Fla. Transmission line will be 12- to 30-inch; 1000 miles of laterals will range from two- to 18-inch.

Deep South Gas Company completed a 12-mile, four-inch gathering system between Rosedale and Irwinville. Carruth Pipeline Corporation, Baton Rouse, was the contractor.

Delta Power & Gas Company plans a line from Big Point field, St. Tammany Parish, to Plaquemines Parish. This line would connect at Big Point field with Louisiana Natural Gas Company's proposed line from Tepetate field.

Gaylord Container Corporation completed 26 miles of eight-inch from Baxterville field to its plant at Bogalusa. Carruth Pipeline Corporation, Baton Rouge, is the contractor.

Louisiana Natural Gas Company will build a line aproximately 145 miles long from Tepetate field, Acadia Parish, to Big Point field, St. Tammany Parish. The line will connect at Big Point field with Delta Power & Gas Company's line from Plaquemines Parish to form the largest intrastate gas system in the south.

Marine Gathering Company will build a ten-mile, eight-inch line from Pure's Rollover field in the Gulf of Mexico to the Louisiana mainland where the gas will be delivered to TGT. Submarine Pipeline Construction Company, Houston, was awarded the contract.

Mississippi River Fuel Corporation completed in October 40 miles of 20-inch from Dubach to Perryville. Mary Construction Company, Cape Girardeau, Mo., was the contractor.

Mississippi River Fuel Corporation has asked FPC authority to increase its capacity to 435 Mmcf by building a new 5500-hp station and installing 22,000 hp in eight previously-authorized stations.

Trunkline Gas Supply Company is building a740-mile line from Longville to Panhandle Eastern Pipe Line Company's Tuscola, Ill., compressor station, with supply laterals to Texas and Louisiana Gulf Coast fields. Houston Contracting Company will build 176 miles of 26-inch from Longville to Darnell, and a 59-mile, 10- and 16-inch lateral from Longville to southwest Louisiana. Anderson Brothers Corporation, Houston, has the contract for 180 miles of 26-inch from Darnell to Senatobia, Miss., and a 217-mile, 24-inch lateral from Garwood, Texas, to Longville. R. H. Fulton & Company, Lubbock, Texas, will build 184 miles of 26-inch from Senatobia to Joppa, Ill., and a 262-mile, 20-inch lateral from McAllen to Altair, Texas. E. J. Mahoney Contracting Company, Mount Pleasant, Mich, will lay 186 miles of 26-inch from Joppa to Tuscola.

United Gas Pipe Line Company has applied for authorization to construct 1005 miles of new pipe line including: 451 miles of 30-inch, 6 miles of 26-inch, 53 miles of 24-inch from Agua Dulce field, Texas, to the Monroe area; 212 miles of 30-inch, 13 miles of 26-inch, 4 miles of 24-inch, 16 miles of 20-inch from The Pure Oil Company's platform off the Louisiana coast to United's Jackson, Miss., station; 215 miles connecting the proposed 30-inch line with various producing areas and extending to Kosciusko, Miss., where United will deliver gas to Texas Eastern; 24 miles of 8-, 12-, and 16-inch connecting various fields in southern Louisiana with the proposed facilities. The building of these lines would initially increase United's capacity by 850 Mmcf.

United Gas Pipe Line Company was authorized to build 8 miles of 8-inch, 9 miles of 12-inch, and 68 miles of 16-inch connecting gas fields in Plaquemines Parish with pipe line facilities near New Orleans.

United Gas Pipe Line Company is planning a 224-mile line from southeastern Louisiana fields to the terminus of Atlantic Gulf Gas Company's proposed Louisiana-South Carolina-Florida line. FPC reopened proceedings in July.

United Gas Pipe Line Company applied for FPC approval of 12 miles of 14-inch extending from Pure's platform off the Louisiana Gulf coast southwesterly to a platform operated by Magnolia Petroleum Company, Continental Oil Company, and Newmont Oil Company; and 14 miles of ten-inch running south from this platform to another platform operated by Magnolia, Continental and Newmont.

United Gas Pipe Line Company applied for permission to construct 11 miles of 12-inch between Soso field and Sherron field, Jasper County, Miss., and 51 miles of 12-inch from these fields to the Mississippi Power Company plant near Meridian, Miss.

United Gas Pipe Line Company has FPC approval to build a 16-mile, 16-inch line from its Koran gasoline plant site in Webster and Bossier parishes to its Carthage-Sterlington line in Bienville Parish.

United Gas Pipe Line Company completed 23 miles of 16-inch from Mud Lake field, Cameron County to Gulf Refining Company's plant at Port Arthur, Texas. Texas-Southern Contracting Company, Fort Worth, was contractor.

United Gas Pipe Line Company completed a 106-mile, 20-inch loop on its Carthage-Sterlington line from De Soto Parish to Monroe. O. C. Whitaker Company, Fort Worth, was contractor.

United Gas Pipe Line Company completed 25 miles of 16-inch loops between Luling and Cut Off. J. Ray McDermott & Company, Inc., Harvey, was the contractor.

United Gas Pipe Line Company built 16 miles of 16-inch from its Carthage-Sterlington line to Koran. Fowler Brothers Contractors, Minden, was the contractor. This line, including a 4000-hp compressor station at Koran, will carry a maximum of 100 Mmcf daily from the Sligo field into United's Carthage-Sterlington line.

Maryland

Prince George's Gas Corporation completed 20 miles of 22-inch to its Chillum compressor station from Atlantic Seaboard Corporation's line at Rockville. Holland Construction Company, Tulsa, was the contractor.

Michigan

Dow Chemical Company completed 27 miles of 12-inch between Midland and Loomis. Mahoney Contracting Company, Mount Pleasant, was the contractor.

Michigan Consolidated Gas Company has an application pending for authority to build a 140-mile, 24-inch loop from the Austin storage field to Detroit, 30 miles of 24-inch from the Austin to the Lincoln-Freeman storage field, and 21 miles of 24-inch from Austin to Reed City storage field.

Michigan Gas & Electric Company completed a ten-mile, six-inch line from Michigan-Wisconsin Pipe Line Company's 22-inch line to Holland, Somerville Construction Company, Ada, was the contractor.

Michigan Gas Storage Company completed 84 miles of 22-inch from Saint Johns to the Winterfield and Cranberry Lake storage fields. This is a continuation of the 75 miles built in 1949 from Panhandle Eastern Pipe Line Company's Chelsea terminal to Saint Johns. E. J. Mahoney Contracting Company, Mount Pleasant, was the contractor.

National Utilities Company of Michigan completed 50 miles of four-through ten-inch laterals serving Grand Haven, Allegan, South Haven, Benton Harbor, and Coldwater from Michigan-Wisconsin's 24-inch line. E. J. Mahoney Contracting Company was the contractor.

Southeastern Michigan Gas Company has been granted permission to lay a 55-mile, 12-inch line from Panhandle Eastern's system in Oakland County to Marysville, for distributing gas in Macomb and Saint Clair Counties.

Mississippi

Carthage Natural Gas District of Mississippi has approval to build 16 miles of four-inch to connect Carthage to Southern Natural Gas Company's system. Hyde Construction Company, Jackson, has the contract.

Chickasawhay Natural Gas District of Mississippi plans a 37-mile, six-inch line from Waynesboro to Transcontinental Gas Pipe Line Corporation's line at Stonewall. Hyde Construction, Jackson, will build it.

Cities of Ripley, Booneville, and Baldwyn have FPC authorization to connect their proposed facilities with Tennessee Gas Transmission Company's line. They will build 16 miles of six-inch from TGT's line to Ripley, and 22 miles of six-inch from Ripley towards Booneville and Baldwyn with a five-mile tap line to Baldwyn and Wheeler and a six-mile tap line to Booneville.

DeSoto Natural Gas District of Mississippi is building 24 miles of four-inch from Texas Gas Transmission Corporation's system at the Mississippi-Tennessee state line to Coldwater. Line will serve the towns of Hernando, Horn Lake, Nesbitt, and Coldwater. Hyde Construction Company, Jackson, is the contractor.

Mississippi Power & Light Company asked permission from FPC to build 13 miles of four-inch between Pace and Rosedale, and 21 miles of four-inch southward from Coldwater.

North Central Natural Gas District of Mississippi has approval to build a 98-mile line to serve various Mississippi towns from Southern Natural Gas Company's system. Distribution facilities will be built in towns and will be leased to Mississippi Gas Company for operation.

Southern Natural Gas Company is at work on a 496-mile line from Gwinville to Aiken, S. C. Sheehan Pipe Line Construction Company, Tulsa, completed 180 miles of 18-inch between Gwinville and Selma; Associated Pipe Line Contractors is building 40 miles of 18-inch between Selma and Elmore, Ala.; 32 miles of 16-inch from Elmore to Mitchell Village, Ala., were completed by Sheehan; 121 miles of 16-inch from Mitchell Village to Bolingbroke, Ga., is under construction by Associated Pipe Line Contractors.

Southern Natural Gas Company completed 24 miles of 24-inch loops in Mississippi, Alabama and Georgia. Sheehan Pipe Line Construction Company, Tulsa, was contractor.

Southern Natural Gas Company completed 23 miles of 12-inch from Douglasville to Newnan, Ga. Latex Construction Company of Georgia, Atlanta, was contractor.

Southern Natural Gas Company has authority to substitute a ten-mile, eight-inch loop for a previously-authorized five-mile, six-inch loop.

Missouri

Associated Natural Gas Company completed 14 miles of 8-inch from Texas Eastern Transmission Corporation's system near Oran to Sikeston; and 21 miles of 6-inch from Sikeston to New Madrid.

The Central West Utility Company applied to FPC for permission to construct a 30-mile, 12-inch line from Cities Service Gas Company's facilities near Kansas City to Central's distribution system in Clay County, Kansas.

Laclede Gas Company completed 20 miles of 22-, 24-, 26-, and 30-inch additions to the main line distribution system in St. Louis. Frazier-Davis Construction Company, St. Louis, was the contractor.

Missouri Central Natural Gas Company applied for permission to lay a 60-mile, 6-inch line from Panhandle Eastern's system near Hannibal to Macon.

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Montana

The Montana Power & Light Company built an 83-mile, 12-inch line from Butte to Bozeman. Deaton & Sons, Inc., Odessa, Texas, was contractor.

Nebraska

Kansas-Nebraska Natural Gas Company, Inc., applied to build 54 miles of 4-inch, 109 miles of 6-inch, 54 miles of 8-inch, and 5 miles of 10-inch to serve 37 Nebraska communities from its main line. Capacity of the system would be increased from 146 Mmcf to 164,200 mcf daily.

North Central Gas Company asked permission to lay 35 miles of 6- and 8-inch line from Huntsman field to Northport, and a 13-mile line from Northport to Bayard. White Ditching Company, Inc., Casper, Wyo., has been given the contract.

North Carolina

Carolina Natural Gas Corporation applied for authority to build 372 miles in 18 laterals to distribute gas to Carolina markets from Transcontinental's line.

Piedmont Natural Gas Company, Inc., has authority to lay 74 miles in six laterals from Transcontinental's line to city distribution systems in North and South Carolina.

Public Service Company of North Carolina filed an amended application with FPC asking permission to build 284 miles of pipe line to serve Carolina communities not included in Piedmont's plans. Public Service also wants to take gas from Transcontinental.

New Jersey

Algonquin Gas Transmission Company asked FPC approval to lay a 255-mile system to supply parts of New England not to be served by Northeastern Gas Transmission Company. It would take gas from Texas Eastern Transmission Company.

Jersey Central Power & Light Company has FPC authorization to build a 29-mile, 8-inch line from South Jersey Gas Company's line at Estelville to Cape May Court House.

Jersey Central Power & Light Company finished 40 miles of 10-inch from Bound Brook to Long Branch. N. J. Construction Service Company, Bound Brook, and Proctor, Inc., Long Branch, were the contractors.

South Jersey Gas Company completed 77 miles of 8-, 10-, 12- and 16-inch from a Transcontinental lateral near Camden to Atlantic City with laterals to Glassboro, Bridgeton, Vineland, and Estelville. G. G. Griffis, Inc., Tulsa, was the contractor.

New Mexico

El Paso Natural Gas Company has been authorized to build 12 miles of 4-inch, 5 miles of 12-inch, and 31 miles of 10- and 16-inch in the vicinity of Phoenix, Ariz.

El Paso Natural Gas Company is building 451 miles of 24-inch transmission line from the San Juan Basin to its 26-inch line near Needles. Included in the project are 96 miles of feeder lines and 175 miles of branch lines. Completion is scheduled for the end of 1951. Company crews are doing the work.

El Paso Natural Gas Company completed 247 miles of 26- and 30-inch loops on its 26-inch line between Eunice and Blythe, Calif.; and 102 miles of 26-inch, and 17 miles of 30-inch main line from Gila station, Ariz., to Needles, Calif. Construction was done by company crews.

El Paso Natural Gas Company completed 116 miles of 12-inch from Snyder to Goldsmith, Texas, and 42 miles of 30-inch in the vicinity of Van Horn. Construction was done by company crews.

El Paso Natural Gas Company completed a 99-mile, 30-inch line from Deming to Tucson, Ariz. Line was built by company crews.

Southern Union Gas Company completed 13 miles of 4- to 14-inch distribution system in Albuquerque. Delmer M. Spafford, Farmington, was the contractor.

Southern Union Gas Company plans 78 miles of 8-, 10-, and 14-inch loops and laterals in New Mexico.

Utah Pipe Line Company asked authority to construct 374 miles of 22-inch and 18 miles of 16-inch between Aztec and Salt Lake City. Laterals would be built to serve communities along the route. The system would have a maximum capacity of 96 Mmcf.

New York

Brooklyn Union Gas Company completed 12 miles of 10-inch line in Brooklyn.

Central Hudson Gas & Electric Corporation laid 40 miles of 10-inch from Home Gas Company's line at Tuxedo to Central Hudson's gas manufacturing plant at Poughkeepsie. Britton Contracting Company, Inc., Washington, Penn., was contractor.

Consolidated Edison Company completed 23 miles of 16- to 30-inch in New York City to take gas from Transcontinental.

Consumers' Gas Company asked permission to construct an 85-mile, 20-inch line from Buffalo to Toronto, Ontario.

Home Gas Company has FPC authority to construct 24 miles of 12-inch, 28 miles of 10-inch, and 18 miles of 8-inch in Orange, Sullivan, and Rockland Counties.

Iroquois Gas Corporation has authorization to build 23 miles of pipe line into Holland, Erie County, and Bennington, Wyoming County, storage fields. FPC authorized development of another new storage field, and enlargement of an old one.

New York State Natural Gas Corporation is building a 164-mile line from its 20-inch line at Dryden to Albany; and a 56-mile line from Dryden to the Tioga County, Penn., storage pool.

Niagara Mohawk Power Corporation has been authorized to build a 55-mile, 10-inch line to provide gas service to Watertown from a connection with New York State Natural's line at Fulton.

Niagara Mohawk Power Corporation is building 16 miles of 14-inch from its system near Syracuse to New York State Natural's proposed measurement station in Onondaga County; and 10 miles of 12- and 16-inch connecting with New York State Natural's system in Oneida and Herkimer Counties.

Niagara Mohawk Power Corporation completed 35 miles of 10- and 14-inch from Therm City to Fulton. Williams-Austin Company, Pittsburgh, was the contractor.

Ohio

East Ohio Gas Company applied to FPC for permission to build 65 miles of 26-inch from New York State Natural's line near Petersburg into Twinsburg Township, Summit County.

East Ohio Gas Company has FPC authorization to construct 12 miles in two 8-inch storage inlet and outlet lines in Columbiana, Mahoning, and Portage Counties.

East Ohio Gas Company completed 24 miles of 20-inch from TGT's system at Petersburg to East Ohio's Austintown station. Tulsa Williams Company, Tulsa, was the contractor.

Manufacturers Light & Heat Company has been authorized to construct 48 miles of 4- to 16-inch line at various points on its system in Ohio, Pennsylvania, and West Virginia, and to install two new 500-hp units at an existing station.

Ohio Fuel Gas Company has been authorized to build 60 miles of 3- to 12-inch line in connection with storage projects in Medina, Lorain, Richland, and Hocking Counties.

Ohio Fuel Gas Company completed 20 miles of 20-inch from Mt. Gilead to Galion, 15 miles of 20-inch between Lime City and Woodville, and 12 miles of 16-inch between Berlinville and South Amherst. Somerville Construction Company, Ada, Mich., built all three lines.

Ohio Fuel Gas Company completed a 22-mile, 16-inch line from Centerville to Dayton, and a 10-mile, 16-inch line from Mansfield to Pavonia. Ohio Pipe Line Construction Company, Greenville, was the contractor.

Pure Transportation Company completed 100 miles of 6-inch between Heath and Dayton. Wabash Contracting Company, Centralia, Ill., was the contractor.

Oklahoma

Cities Service Gas Company completed 23 miles of 10- and 12-inch in West Edmond field. Gragg Construction Company, Britton, was the contractor.

Lone Star Gas Company asked authorization to build 57 miles of pipe line from its present system to Idabel, Broken Bow, and Antlers. Company plans distribution systems in these communities.

Oklahoma Natural Gas Company plans to construct 65 miles of 26-inch between Edmond and Depew, and 38 miles of 16-inch from Ninnekah to the county line. Trojan Construction Company, Oklahoma City, will build the 26-inch line.

Oklahoma Natural Gas Company completed 22 miles of 10-inch between Stillwater and Guthrie. Trojan Construction Company was contractor.

Plains Natural Gas Company completed 198 miles of 4- to 24-inch gathering system in Hugoton field. Midwestern Constructors did the engineering; Arey-Phillips Construction Company, Pampa, Texas, was contractor.

Pennsylvania

Acme Natural Gas Company completed 25 miles of 6-, 8-, and 10-inch to supply three Butler industrial consumers from Manufacturers Light & Heat Company's system. Williams-Austin Company, Pittsburgh, was contractor.

Consolidated Natural Gas Corporation plans to build a 164-mile line from Boom to Cortland, Ithaca, Schenectady, and Albany, N. Y., and 26 miles of 16-inch loop line in Pennsylvania.

Equitable Gas Company has been authorized to build a 3960-hp compressor station and 17 miles of 6-, 8-, 12-, and 16-inch line near Waynesburg.

Erie Gas Service Company, Inc., has application before FPC for construction of a 72-mile line from TGT's Kentucky-Buffalo line near Meadville to Wickliffe, Ohio. The line will supply gas to utility companies serving towns east of Cleveland.

Grand River Gas Transmission Company has applied for permission to build 70 miles of 10-inch and 7 miles of 8-inch from TGT's line at Meadville to Fairport and Ashtabula, Ohio.

Harrisburg Gas Company completed 20 miles of of 8-inch from Manufacturers Light & Heat Company's line at Maytown to Steelton. Northeastern Construction Company, Harrisburg, was the contractor.

Lake Shore Pipe Line Company asked FPC permission to build a 45-mile line from TGT's line at Meadville to Ashtabula. It would serve the same area as the lines proposed by Erie Gas Service Company and Grand River Gas Transmission Company.

New York State Natural Gas Corporation completed 21 miles of 20-inch between Murrysville and Bakerstown. Williams-Austin Company, Pittsburgh, was contractor.

Pennsylvania Gas Company completed eight miles of four-inch and 12 miles of eight-inch between its main line and a connection with TGT's system in Erie County.

Manufacturers Light & Heat Company laid 40 miles of six- to ten-inch line in the vicinity of York. Britton Contracting Company, Inc., Washington, was the contractor.

New York State Natural Gas Corporation has been authorized to build 54 miles of 16-inch loop from Greene County compressor station to Westmoreland County compressor station.

New York State Natural Gas Corporation has been authorized to build a 70-mile, 20-inch line from the Oakford storage area to the facilities of the East Ohio Gas Company at the Ohio-Pennsylvania state line. New York State Natural and Texas Eastern Transmission Corporation plan to develop a storage capacity in the Oakford area of 105,000 Mmcf which could be withdrawn at the rate of 400 Mmcf per day, to be divided equally between the two companies.

New York State Natural Gas Corporation is building 44 miles of 16- and 18-inch connecting its system in Pennsylvania with the Leidy gas field.

New York State Natural Gas Corporation completed 63 miles of 20-inch from Westmoreland County to a connection with East Ohio Gas Company at the Pennsylvania-Ohio state line. Tulsa-Williams Company, Tulsa, and Williams-Austin Company, Pittsburgh, were contractors.

New York State Natural Gas Corporation completed 46 miles of 16- and 18-inch in the vicinity of Renova. Pipeline Construction & Drilling Company, Camp Hill, was contractor.

New York State Natural Gas Company completed 26 miles of 16-inch from Colvin station, Washington County, to Murrysville, Westmoreland County. Williams-Austin Company, Pittsburgh, was the contractor.

Texas Eastern Transmission Corporation has been authorized to build 35 miles of 30-inch from its system in Fayette County into the Oakford storage area, and to operate jointly with New York State Natural an underground storage project in Westmoreland County (See New York State Natural Gas Corporation.)

United Natural Gas Company asked permission to construct 21 miles of 6-, 8-, and 12-inch line in Venango, Perry, and Mercer Counties. The project also includes the addition of 150 hp in three units at Henderson, Venango County, station.

United Natural Gas Company completed 60 miles of 12-inch in the vicinity of Brookville. Williams Bros. Corporation, Tulsa, was the contractor.

Tennessee

East Tennessee Natural Gas Company applied for permission to build 21 miles of 6-inch, 18 miles of 8-inch, and 100 miles of 16-inch from Knoxville to Bristol.

East Tennessee Natural Gas Company completed a 353-mile line from TGT's system at Lobelville to Oak Ridge. Oman Construction Company, Nashville, built 230 miles of 12-, 16-, and 22-inch from Lobelville to Tullahoma and from Athens to Oak Ridge. N. A. Saigh Company, San Antonio, built 123 miles of 12-inch between Tullahoma and Athens. A line serving Oak Ridge from TGT's line at Portland was built in 1949 by East Tennessee Natural.

Tennessee Natural Gas Lines, Inc., applied for permission to build nine miles of ten-inch connecting its lines to TGT's system.

Tennessee Natural Gas Company completed 24 miles of 8-, 10-, and 12-inch to supply Nashville Gas & Heating Company for distribution in the Nashville area. N. A. Saigh Company, Inc., San Antonio, Texas, was contractor.

East Texas

Arkansas-Louisiana Gas Company completed 72 miles of 20-inch from Waskom field to Magnolia, Ark., built by Anderson Bros. Corporation, Houston; and 91 miles of 20-inch from Magnolia to Malvern, Ark., completed by Latex Construction Company, Houston.

Humble Oil & Refining Company completed 50 miles of eight-inch and ten miles of four- and six-inch from Trawick field, Nacogdoches County, to Tennessee Eastman Corporation's new chemical plant southeast of Longview. Trojan Construction Company, Oklahoma City, was contractor.

Texas Gas Transmission Corporation plans a 290-

mile line from newly-acquired gas fields in South Louisiana to its main line near Monroe, La.

Texas Gas Transmission Corporation completed 103 miles of 20-inch transmission line from Carthage field to Lisbon field, La. N. A. Saigh Company, Inc., San Antonio, was contractor.

Texas Gas Transmission Corporation completed a 32-mile, 12-inch lateral between Slaughters, Ky., and Evansville, Ind. J. Ray McDermott & Company, Inc., Harvey, La., was contractor.

Texas Gas Transmission Corporation has been authorized to build a 3960-hp compressor station on its 20-inch line near Shreveport, a 4500-hp station in Kentucky, and 5460-hp in four stations in Tennessee and Kentucky.

North Texas

Lone Star Gas Company is building 49 miles of 8-, 10-, and 12-inch between Jacksboro field, Wise County, and the north Fort Worth measuring station. Company crews are doing the work.

Southwest Texas

Delhi Oil Company will build 70 miles of eight-inch from Lopeno field, Zapata County, to Laredo. Altgelt Construction Company, Corpus Christi, has the contract.

Provident Gas Company built ten miles of four- and six-inch gathering system in Longhorn field, Duval County, to tie into Transcontinental Gas Pipe Line Corporation's line. Altgelt Construction Company was contractor.

Sun Oil Company completed 30 miles of three- through eight-inch gathering system in Starr County. Shanks & Eustace, Alice, was contractor.

Tennessee Gas Transmission Company has been authorized to build 303 miles of 26-inch transmission line from Buffalo to the New York-Massachusetts state line; 787 miles of 24-, 26- and 30-inch loops along its Texas-Buffalo line; 75 miles of supply laterals. Company will build seven new stations with a total of 42,080 hp and will install 69,600 hp in existing or authorized stations. These facilities will raise the system capacity to 1310 Mmcf.

Tennessee Gas Transmission Company applied for permission to increase its system capacity to 1425 in order to export 115 Mmcf to Canada. The project would include the building of a 45-mile line from Buffalo to the U. S.-Canadian border near Niagara Falls; 170 miles of loop line along the TGT system between Texas and Kentucky; 96 miles of loop along its Kentucky-Buffalo extension; 100 miles of miscellaneous lateral lines; two new compressor stations of 8000 hp each; and 56,000 hp in existing stations.

Tennessee Gas Transmission Company completed 395 miles of 26-inch transmission line from northeastern Kentucky to Buffalo. H. C. Price Company, Bartlesville, Okla., was the contractor. This extension, including construction of a compressor station near Load, Ky., increased the system capacity to 1060 Mmcf.

Tennessee Gas Transmission Company completed a 95-mile, 20-inch lateral from its main line at Natchitoches to Kinder, La. Latex Construction Company, Houston, was contractor.

Tennessee Gas Transmission Company completed a 40-mile, 16-inch lateral from Beaver Falls to Pittsburgh, Penn. Britton Construction Company, Weatherford, was the contractor.

Tennessee Gas Transmission Company completed a 32-mile, 26-inch loop between Fremont and Agua Dulce. Sheppard & Geiger Construction Company, Corpus Christi, was contractor.

Tennessee Gas Transmission Company completed the following 30-inch loops along its main line: 72 miles between Agua Dulce to Woodsboro, built by Oklahoma Contracting Corporation, Dallas; 68 miles between Many and West Monroe, La., 33 miles between Jones, La., and the Mississippi River, and 32 miles across the southeast corner of Arkansas, built by Latex Construction Company, Houston; 93 miles between Drew and Holly Springs, Miss., by Oklahoma Contracting Corporation; 228 miles at intervals between Selmer, Tenn., and Lebanon, Ky., built by Price-Morrison, Austin.

Tennessee Gas Transmission Company completed the following supply and distribution laterals along its line: 26 miles of 12-inch from Starr County to Hidalgo County, and 42 miles of 12-inch from Alice to Freer, built by Sheppard & Geiger Construction Company, Corpus Christi; 13 miles of 6-inch in the vicinity of Alice, built by Shanks & Eustace, Inc., Alice; 15 miles of 6-inch near Tomball, built by Latex Construction Company, Houston; 54 miles of 12- and 16-inch from Kinder to Grand Chenier, La., 102 miles of 16-inch and 11 miles of 12-inch from Kinder to Bayou Sale, La., 15 miles of 12-inch from Delcambre to Tigre Lagoon, La., built by Latex Construction Company; 57 miles of 8-inch between Greensburg and Brandenburg, Ky., built by Brown & Root, Inc., Houston.

Texas Illinois Natural Gas Pipe Line Company is at work on its 1331-mile line from La Gloria field to Joliet, Ill. One hundred miles of 26-inch from La Gloria to Refugio is being built by Midwestern Constructors, Inc., Tulsa; 97 miles of 26-inch from Refugio to Hungerford and 38 miles of 12-inch from Old Ocean field to Chocolate Bayou field were sublet from H. C. Price Company, Bartlesville, Okla., and completed by Western Pipe Line Constructors, Inc., Austin; 36 miles of 24-inch between Wharton and Old Ocean field, and 110 miles of 30-inch from Hungerford to Cleveland have been completed by H. C. Price Company; 199 miles from Cleveland to Texarkana have been let to H. C. Price Company; 100 miles of 30-inch from the Mississippi River to Effingham, Ill., is under way by Midwestern Constructors, Inc.; 209 miles of 30-inch from Effingham to Joliet are scheduled for 1951 construction by Midwestern Constructors, Inc. Three compressor stations will be built by Fish Pipeline Construction Company, Houston. Initial capacity will be 374 Mmcf.

Texas Illinois Natural Gas Pipeline Company has FPC authorization to build 43 miles of 20-inch from the area north of La Gloria field northwest to Clayton, and 26 miles of 20-inch from Clayton south to Hagist Ranch field.

Transcontinental Gas Pipe Line Corporation completed its 1840-mile line from the Texas Rio Grande Valley to New York and Brooklyn. Fish Constructors, Inc., Houston, held the master contract. Sub-contracts were let as follows (pipe is 30-inch unless otherwise mentioned): Schedule A—38 miles of ten-inch and 42 miles of 14-inch from Mercedes to Falfurrias to Massey Pipe Line Construction Company, Corpus Christi; Schedule B—109 miles of 24-inch from Falfurrias to Inari to H. B. Zachry Company, San Antonio; 44 miles of 26-inch from Inari to Edna to Oklahoma Contracting Corporation, Dallas; Schedule C—74 miles of 26-inch from Edna to the Harris-Fort Bend County line to Oklahoma Contracting Corporation; 40 miles from the County line to Porters to Williams Bros.-Davis Company, Houston; Schedule D—92 miles from Porters to the Sabine River at Deweyville to Texas Southern Contracting Company, Fort Worth; Schedule E—82 miles from Deweyville to Eunice, La., to Anderson Brothers Corporation, Houston; Section 1—66 miles from Eunice to the Mississippi River to Morrison Construction Company, Inc., Austin; Section 2—112 miles from the Mississippi to Bassfield, Miss., to Morrison Construction Company; Section 3—112 miles from Bassfield to the Tombigbee River at Demopolis, Ala., to Wunderlich & Griffis Construction Company, Tulsa; Sections 4 and 5—206 miles from Demopolis to Newnan, Ga., to Midwestern Constructors, Inc.; Section 6—108 miles from Newnan to Danielsville, Ga., to Williams Bros. Corporation, Tulsa; Section 7—86 miles from Danielsville to Spartanburg, S. C., to Williams Bros; Section 8—102 miles from Spartanburg to the Catawaba River, N. C., to R. H. Fulton & Company, Lubbock; Section 9—100 miles from the Catawaba River to Spray, N. C., to R. H. Fulton & Company; Section 10—86 miles from Spray to the James River, Va., to Smith Contracting Corporation, Fort Worth; Section 11—110 miles from the James River to the Potomac River near Falls Church, Va., to Smith Contracting Corporation; Section 12—76 miles from Falls Church to the Susquehanna River near Conowingo, Penn., to Associated Pipe Line Contractors, Inc., Houston; Section 13—90 miles from Conowingo to the Delaware River, Penn., to Wunderlich & Griffis Construction Company; Section 14—61 miles from the Delaware River to Linden, N. J., to Wunderlich & Griffis; Section 15—23 miles from Linden to the Hudson River at Edgewater, N. J., to Oklahoma Contracting Company, Inc. Sections 1, 2, 3, 4, and 6, comprising 501 miles, were completed in 1949.

Transcontinental Gas Pipe Line Corporation completed the following gathering laterals in Texas: 58 miles of 4- to 14-inch in the El Campo area, built by T. & R. Construction Company, Houston; 98 miles of 6- to 14-inch in the Wharton area, built by Altgelt Construction Company, Corpus Christi; 38 miles of four- to eight-inch in the Sinton area, built by Shanks & Eustace, Inc., Alice; 61 miles of six- to ten-inch in the Dix area, built by Victoria Oil Field Maintenance Company, Victoria.

Transcontinental Gas Pipe Line Corporation completed 85 miles of 4- to 14-inch gathering system in southern Louisiana. Latex Construction Company, Houston, was the contractor.

Transcontinental Gas Pipe Line Corporation completed 50 miles of 18- and 20-inch from Eunice to a point 15 miles south of Crowley, La. Texas-Southern Contracting Company, Fort Worth, was the contractor.

Transcontinental Gas Pipe Line Corporation completed a 20-mile, 20-inch sales lateral from its main line to Marcus Hook, Penn. Conduit and Foundation Corporation and John Meehan & Son, Philadelphia, were the contractors.

Transcontinental Gas Pipe Line Corporation completed 40 miles of 6- and 8-inch sales laterals in Pennsylvania. Northeastern Construction Company, Harrisburg, Penn., was the contractor.

Transcontinental Gas Pipe Line Corporation was authorized to build 36 miles of 24-inch from Berger County, N. J., to Greenwich, Conn., an 8-inch lateral to Paterson, N. J., and a 6000-hp compressor station in Westchester County, N. Y. However, Transcontinental has proposed substitutions in a subsequent application.

Transcontinental Gas Pipe Line Corporation is building 8 miles of 10-inch and 9 miles of 30-inch from its main line to Paterson, N. J. Oklahoma Contracting Corporation, Dallas, is the contractor.

Transcontinental Gas Pipe Line Corporation has application before FPC for permission to build 11 miles of 20- to 26-inch from its main line near East Carteret, N. J., to the Bay Ridge section of Brooklyn. Line would constitute an auxiliary connection for the delivery of gas to metropolitan New York.

Transcontinental Gas Pipe Line Corporation has authority to increase the capacity of its system to 555 Mmcf by adding 45,675 hp in compressor capacity at existing stations.

United Gas Pipe Line Company completed 34 miles of gathering lines in fields in Dewitt and Goliad Counties, and 12 miles of 16-inch to connect them to the company's 16-inch Refugio-San Antonio line. Brown & Root, Inc., Houston, was the contractor.

Valley Gas Pipe Line Company, Inc., applied to FPC for permission to build a 1440-mile line from Texas and Louisiana to southern Michigan. A 24-inch line would run from Goliad County to the Saratoga field in Hardin County, where it would be joined by a 24-inch line from the Vermilion Bay, La., area, offshore to Sabine Pass. From Saratoga a 1000-mile, 30-inch line would cross Louisiana, Arkansas, Missouri, Illinois, and Indiana, terminating in southern Michigan. Plans call for 13,250-hp stations at Saratoga and Poplar Bluff, Mo., and for 70,000 hp in additional stations to be installed as needed. Initial capacity would be 330 Mmcf; ultimate capacity 505 Mmcf. If approved, the line will increase by 20 percent the amount of gas going north and east from the Gulf Coast.

Western Natural Gas Company is building a 55-mile, 2- through 6-inch gathering system in Live Oak County. Stuart Pipe Line Construction Company, Beeville, Texas, is the contractor.

Texas Panhandle

Cities Service Gas Company is building 9 miles of 26-inch in the vicinity of Pampa. R. H. Fulton & Company, Lubbock, is the contractor.

Colorado Interstate Gas Company has FPC authorization to lay a 215-mile, 20-inch line from the West Panhandle field to its Lakin-Denver line at Kit Carson, Colo. A 4800-hp compressor station will be built at the southern end.

Michigan-Wisconsin Pipe Line Company has been authorized to install 139,200 hp of additional compressor capacity on its main line to increase the sales capacity to 110,595 Mmcf.

Panhandle Eastern Pipe Line Company is authorized to build 172 miles of loop line in Illinois, Indiana, and Michigan, and to install 16,000 hp in existing stations. These facilities, which will increase system capacity to 800 Mmcf, are largely to handle gas from Trunkline's authorized Louisiana-Illinois line. FPC has also approved for construction in connection with this program 188 miles of previously-authorized line and additional compressor units in existing stations.

Panhandle Eastern Pipe Line Company completed 30 miles of 30-inch loop between Rockville, Ind., and Glenarm, Ill., and a 16-mile, 26-inch loop in the vicinity of Decatur, Ill. Anderson Bros. Corporation, Houston, contractor, will build another 26-mile loop in 1951.

Panhandle Eastern Pipe Line Company completed 69 miles of 26-inch in four loops between Hugoton and Olpe, Kansas. Midwestern Constructors, Inc., Tulsa, was the contractor.

Panhandle Eastern Pipe Line Company completed 85 miles of 4- through 12-inch from Dumas to Hugoton. Knupp Construction Company, Inc., Great Bend, Kansas, was contractor.

Phillips Petroleum Company is building 14 miles of 24-inch in Sherman County and in Oklahoma. Arey-Phillips Construction Company, Hooker, Okla., is the contractor.

Phillips Petroleum Company completed 118 miles of 3- to 22-inch gathering system in Sherman and Hansford Counties. Vaughn & Taylor Construction Company, Inc., Wichita Falls, was the contractor.

Upper Texas Coast

Houston Pipe Line Company completed 14 miles of 12-inch between Crosby and Baytown. L. E. Farley, Inc., Houston, was contractor.

Pacific Northwest Pipeline Corporation asked authority to build a 2175-mile, 26-inch line from Wharton County to Washington state. Also included in the plans are 400 miles of 22-inch and smaller laterals, and 13 compressor stations of 6400 hp each. Estimated to cost $174 million, the line would have an initial capacity of 250 Mmcf. The company plans to purchase 100 Mmcf daily from Alberta gas fields, and to supply Vancouver, B. C.

Shell Pipe Line Corporation will build 20 miles of 8-inch from the Hope and Brushy Creek fields to Provident City.

Texas Eastern Transmission Corporation asked FPC in an amended application for a permit to construct a 791-mile, 30-inch line from Kosciusko, Miss., to a connection with its system near Connellsville, Penn. The project includes installation of 46,400 hp in seven stations on the new line, and 52,500 hp in six new stations on the existing line. Texas Eastern would supply Algonquin Gas Transmission Company with 260 Mmcf per day at a connection near Lambertville, N.

J., for resale in New England. The new facilities, estimated to cost $117 million, would bring Texas Eastern's total capacity to 1216 Mmcf.

Texas Eastern Transmission Corporation has been given authority to build 10 miles of 10-inch from its main line to Arkansas-Missouri Power Company's plant in Dunklin County, Mo.

Texas Eastern Transmission Corporation completed 100 miles of 16-inch transmission line between Provident City and its Baytown terminal. Smith Contracting Corporation, Fort Worth, was the contractor.

Texas Eastern Transmission Corporation completed 34 miles of 20-inch loop between Beaumont and Hankamer, built by Associated Pipe Line Contractors, Inc., Houston; and 178 miles of 26-inch loop between Lebanon and Beallsville, Ohio, built by Associated Pipe Line Contractors, Inc., and Williams Bros. Corporation, Tulsa.

United Gas Pipe Line Company finished 9 miles of 8-inch in the vicinity of Rosenberg with Massey Pipeline Construction Company, Corpus Christi, as contractor.

United Gas Pipe Line Company completed 50 miles of 30-inch from Magnet-Withers field to Missouri City, and 28 miles of 24-inch from Missouri City to Shell Oil Company's Houston refinery. Texas-Louisiana Contractors, Fort Worth, built the 30-inch, Brown & Root, Inc., Houston, completed the 24-inch.

West Texas

Barnsdall Oil Company completed 100 miles of 2- through 8-inch gathering system near Snyder. C. O. Holder Construction Company, Columbus, was contractor.

Lion Oil Company completed a 70-mile, 2- to 12-inch gathering system in Diamond "M" and Sharon Ridge fields, Scurry County. George Tucker Pipe Line Construction Company, Odessa, was the contractor.

Lone Star Gas Company is building 31 miles of 12-inch from Scurry County fields to Sweetwater, in Nolan County. W. L. Golightly Construction Company is contractor.

Sunray Oil Corporation is building 133 miles of 2- through 30-inch in the vicinity of Snyder. Vaughn & Taylor Construction Company, Inc., Wichita Falls, is the contractor.

Utah

Utah Natural Gas Company has amended its application to the Utah Public Service Commission for permission to build 325 miles of 22-inch from the Four Corners area to Salt Lake City. It now wants to include 171 miles from the Last Chance area in Emery County to run through Sevier and Sanpete Counties to Salina and south to Richfield.

Virginia

City of Charlottesville completed 14 miles of 6-inch from Virginia Gas Transmission Corporation metering and regulating station near Doylesville, Va., to the city's distribution system. Lehman, Hoge & Scott, Harlingen, Texas, was contractor.

City of Danville completed 14 miles of 6- and 8-inch from Transcontinental's line to the city storage tanks. M. L. Bles Construction Company, Danville, was contractor.

Commonwealth Natural Gas Corporation completed 200 miles of 12- and 18-inch from Virginia Gas Transmission Corporation's line in Greene County to the Norfolk area. Ray L. Smith & Son, Inc., was contractor.

Lynchburg Gas Company asked authority to lay a 15-mile line from Transcontinental's line in Appomattox County to a point in Campbell County adjacent to Lynchburg.

Natural Gas Service Corporation has application pending to build 92 miles of 12-inch to carry gas to Richmond, Hopewell, and Petersburg from a connection with Transcontinental's line at Buckingham.

Roanoke Pipe Line Company completed 30 miles of 8-inch from Virginia Gas Transmission Corporation's line at Gala to Roanoke. Lehman, Hoge & Scott, Corpus Christi, was contractor.

Shenandoah Gas Company applied for FPC permission to build 38 miles of 8-inch and 11 miles of 3- and 4-inch to take gas from Virginia Gas Transmission Corporation's line near Cedarville to several communities in Virginia and West Virginia.

Southwestern Virginia Gas Transmission Company seeks FPC authority to construct a 17-mile line from Transcontinental's system near the North Carolina-Virginia state line to Martinsville.

Washington

Northwest Natural Gas Company has an application pending for authority to build 606 miles of 24-inch and 150 miles of 18-inch in Washington, Oregon, and Idaho. Alberta gas would be carried to Seattle and Portland, then north to Vancouver, B. C.

Westcoast Transmission Company, Inc., has applied for authority to build a 277-mile line from Sumas, to Seattle and Tacoma, Wash., and Portland, Ore., and a 266-mile branch line from Osoyoos, B. C., to Spokane and the AEC plant at Hanford. These lines would be the American sections of a system proposed by Westcoast Transmission Company, Ltd., a Canadian company, to serve British Columbia and Washington cities from Alberta gas fields.

West Virginia

Bluefield Gas Company has been authorized by FPC to build a 14-mile, 6-inch connection between Amere Gas Utilities Company's line at Princeton, and Bluefield, Va.

Cumberland and Allegheny Gas Company has applied for authority to build 10 miles of 6- and 8-inch line from Grant County into Garrett County, Md. It has been authorized to build a 65-hp station in West Virginia.

Hope Natural Gas Company completed 20 miles of 18- and 20-inch from its Tonkin compressor station in Doddridge County to the Fink storage area. Pipe Line Construction & Drilling Company, Camp Hill, Penn., was the contractor.

New River Gas Company asked permission to build 50 miles of line from a connection with Atlantic Seaboard Corporation's system in Summers or Monroe County to Radford, Va., with laterals to serve four towns along the way.

United Fuel Gas Company completed 12 miles of 10- and 20-inch from TGT's transmission line to storage fields near Nitro and Clendenin. Williams-Austin Company, Pittsburgh, was contractor.

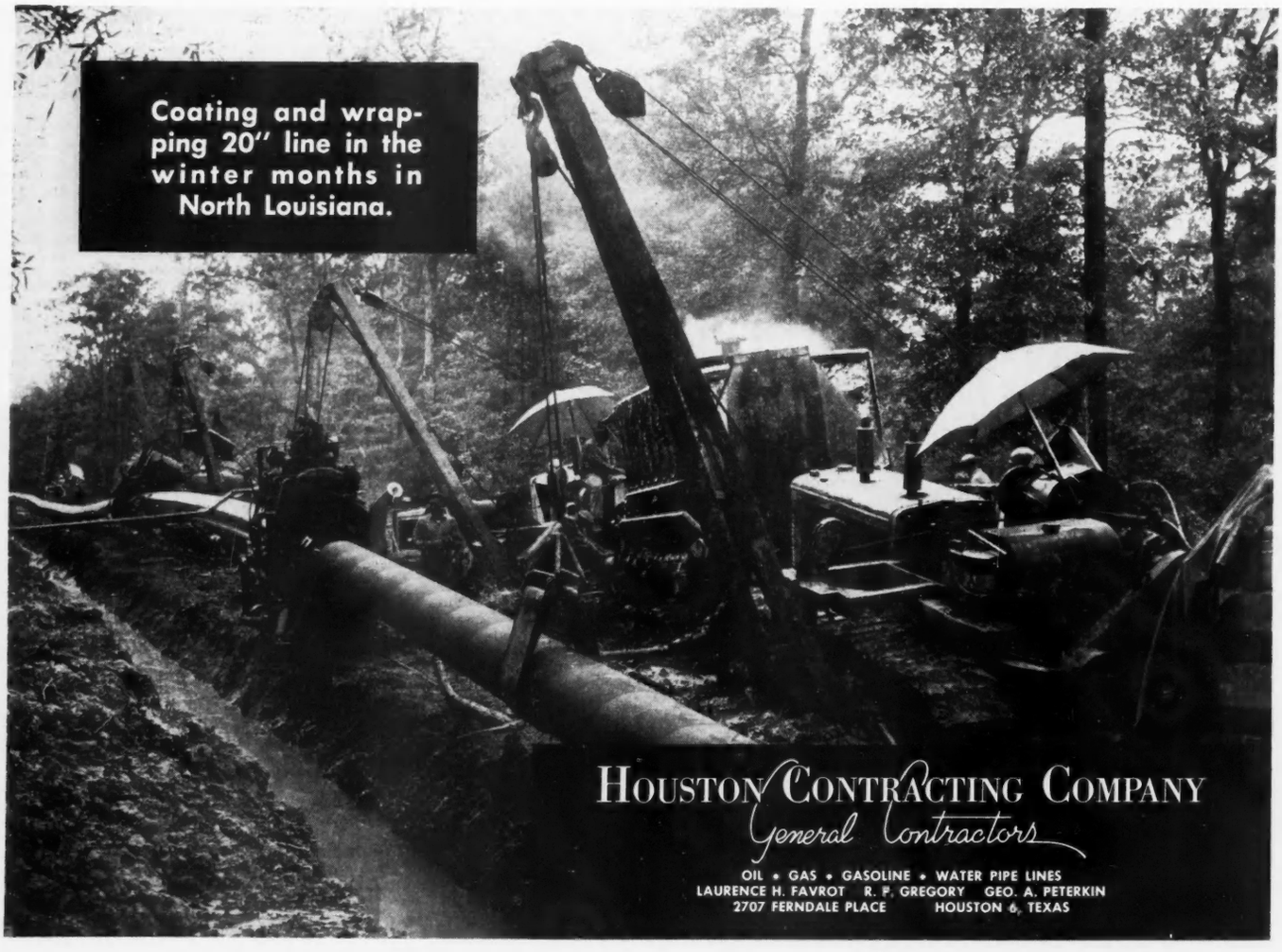
Wisconsin

Michigan-Wisconsin Pipe Line Company has been authorized to raise its capacity to 110,595 Mmcf by the addition of 109,600 hp at 14 points along its main line.

Michigan-Wisconsin Pipe Line Company completed 197 miles of 8- to 14-inch main line between Milwaukee and Green Bay with laterals to Fond du Lac and Sheboygan. G. G. Griffis Construction Company, Tulsa, was the contractor.

Wyoming

Montana-Dakota Utilities Company and **Montana-Wyoming Gas Pipe Line Company** finished their 340-mile, 12-inch line from Worland field to Montana-Dakota's Cabin Creek, Mont., station. Conyes Construction Corporation, San Pablo, Calif., was contractor.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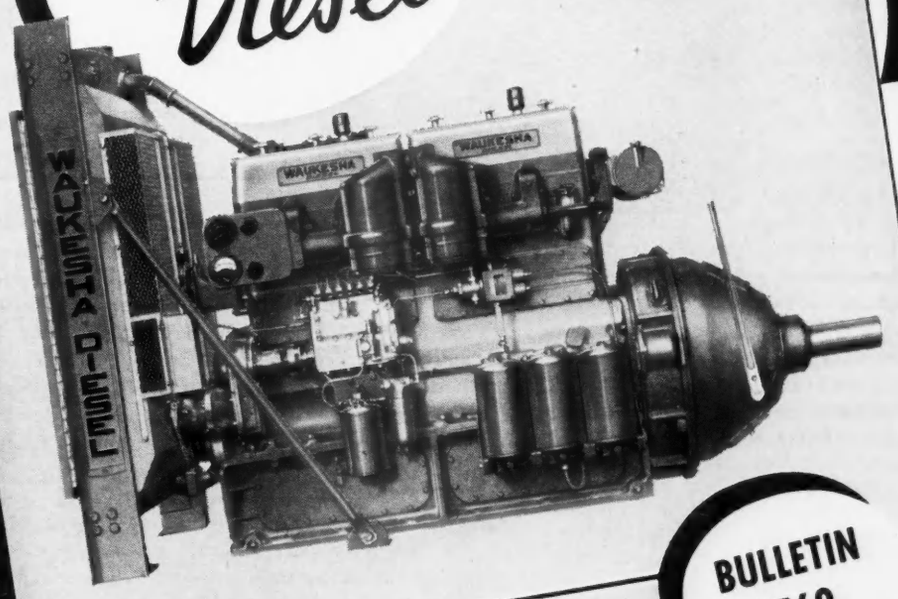

BULLETIN
1569

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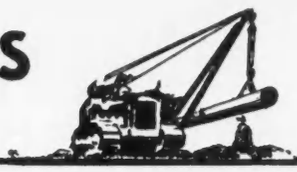
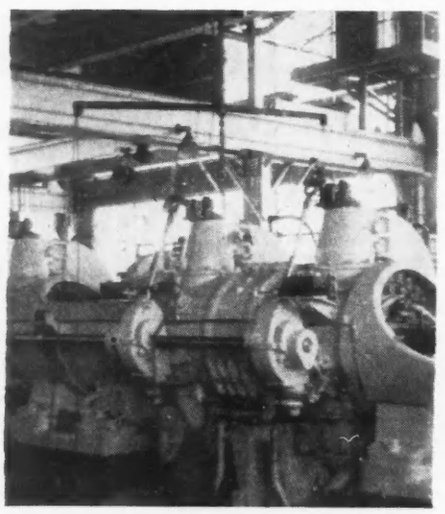
PIPE LINE HINTS

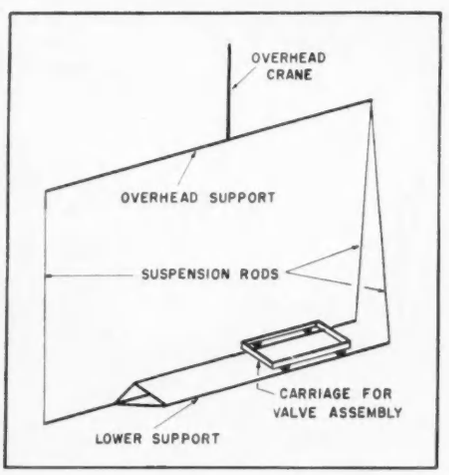


$10 is paid for each illustrated acceptable contribution. Mail to The Editor, WORLD OIL, P. O. Box 2608, Houston 1, Texas.

HOW TO—Remove Exhaust Valves from Compressors

The removal and repair of exhaust valves on some types of reciprocating compressors is a time-consuming and laborious operation. Because these valves and heads are on the underside of the cylinder and because of their bulk and weight, they are difficult for workmen to disassemble and lift out for repairs. To facilitate this operation and reduce the down-time on the compressor, as well as increase the safety of the repair job, a special crane-supported track and four-wheel carriage were designed and fabricated in the machine shop. This device is shown in the schematic diagram and in actual use in the illustration.



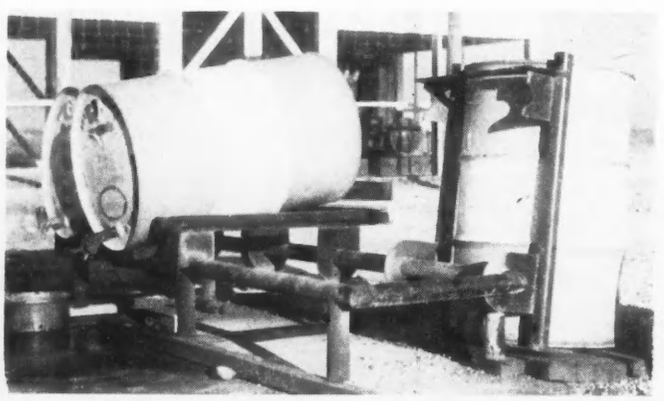


The lower suport of the removing equipment is placed across the pit directly under the valve to be removed. Then, by use of the overhead crane in the compressor building, the overhead support is lowered and the suspension rods are connected to the lower support by pins. The traveling carriage is then moved in under the valve and the entire support lifted until the carriage is snug beneath the valve. Locks on the wheels of the carriage prevent its movement until the operator has safely landed the valve assembly on the carriage.

Bolts holding the valve assembly to the compressor are removed and the entire unit lowered slowly until it is resting across the pit beneath the compressor. The locks on the wheels are released and the valve assembly moved out in the clear where it can easily be inspected and repaired. The tracks and suspension rods are not moved during this operation, but merely serve to facilitate the use of the carriage and setting it in place. To install the repaired valve assembly, the procedure is reversed, and the device lifted out of the way and returned to its storage place.

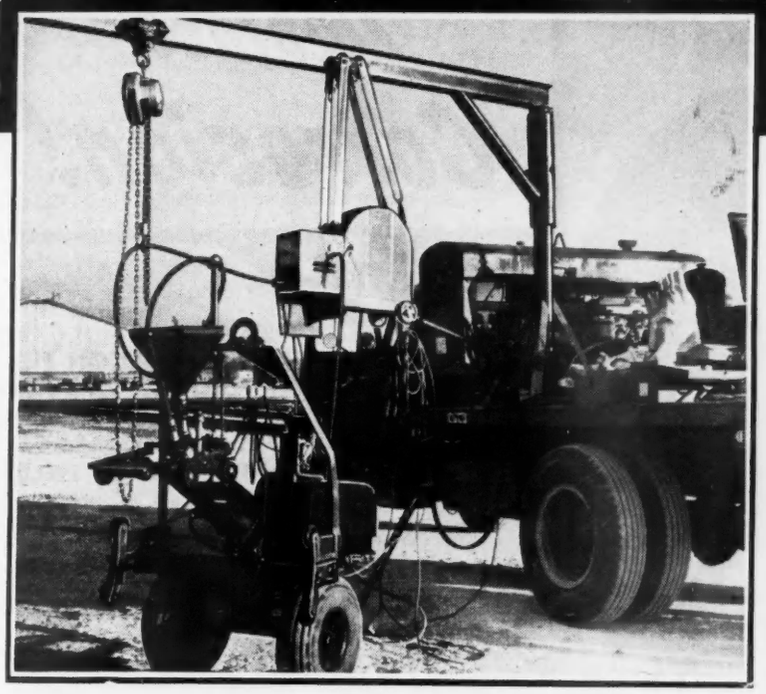
HOW TO—Set Up Convenient Lubricating Drum Rack

A one-man drum rack may be made of scraps of material usually found around the plant yard. It consists of a frame of 2½-inch scrap pipe with legs welded to the bottom and six plates with holes cut to fit the 2½-inch pipe and slipped over one runner of the frame. The plates are then welded to another set of pipe frames which are used to cradle the drums. The frames for the drums are held together on one end with a steel plate six inches wide and on the other end by a ¾-inch bar which is bent to make room for the drum. This end of the frame also carries a steel plate which rests on the front end of the large frame when the drums are in position for emptying.



In operation, the drums are unloaded and set on the steel plate on the small drum cradles. One man then can grasp the top of the drums and lay them down over the rack. When they are nearly empty, the back end of the drum can be raised and a short board placed underneath so as to completely drain the drum. To lessen the strain when loading the rack with a full drum of lubricating oil or solvent, a cheater may be used in the longitudinal drum supports. The next-smaller size pipe can be inserted into these supports whose ends are open, and a greater leverage gained.

Now.. a tested method of welding to meet today's inspection standards!



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The O. R. Smith organization has made an entirely new approach to the problem of double-jointing and sectioning all sizes of pipe from 4 inch to 36 inch under "firing line" conditions. The primary aim has been to develop an economical, yet effective method of sectionizing pipe, with the smallest possible amount of equipment to maintain lightness and mobility in the field. This aim has been achieved to a remarkable extent when it is realized that the whole rig is about one-tenth the weight of the equipment previously used for doing the same work.

The effectiveness of the equipment was recently demonstrated at the Brown & Root pipe yard at Greens Bayou, Houston, when over 100 sample welds were produced using 40 foot lengths of 16" pipe. As the welding is carried out entirely by the submerged arc process without any tacking or hand stringer bead, a higher degree of uniformity and quality is obtained than when submerged arc welding is used in conjunction with a manual stringer bead.

The actual welding operation is simplified by several automatic and self adjusting features on the equipment. The height of the weld above the surface of the pipe, the width, and the penetration on the inside of the pipe, may be regulated by various combinations of these adjustments in addition to the welding speed, amperage and voltage, etc.

Numerous tensile tests have been made on welds produced by this process, which show that the welded metal is invariably stronger than the pipe, and a Bend Test of 180 degrees has no effect on the weld. There is no weakening of the pipe adjacent to the weld as the inside of the pipe is protected from sudden chilling by the internal line-up clamp, and the heat retained by the clamp gives the next joint of pipe a preheating which is desirable when welding while the atmospheric temperature is low.

Examinations of the micro-structure of the welds indicate perfect fusion has taken place between the pipe and the weld. As the second pass follows immediately upon the first, the metal does not have a chance to cool, and the relatively high amperage produces sufficient heat to penetrate about two-thirds of the way into the first weld, while the heat retained by the protective coating of slag completes the normalizing process to give the weld strength and ductility.

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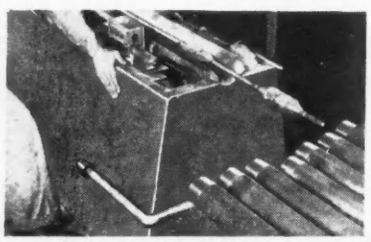
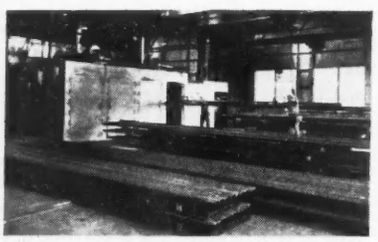


Tube-Kote fully automatic internal coating unit applies a carefully controlled film of "TK-2" plastic in each coating operation.



A view of the Tube-Kote baking ovens which can handle over 12,000 feet of tubular goods per hour.

TUBE-KOTE

TUBE-KOTE

First Name In Corrosion Resistance

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WIRE, PHONE OR WRITE FOR TUBE-KOTE TECHNICAL SERVICE BULLETIN

HOW TO—

Convert Light Truck For Use of Gauger

Where a lease truck is used to keep up with the work of the gauger, a simple box for the equipment used by the gauger may be constructed from materials usually found around the welder's shop. The box fits neatly behind the cab of the pickup truck and permits use of the remainder of the bed for light hauling.

The box is constructed of used tank steel and consists of one large compartment for various tools, shown at the right, and two smaller compartments, on the left for the gauger's equipment. The left compartments are made with a drawer in the bottom easily reached by the gauger. In it is kept his sampling device and other tank gauging equipment in a small hamper which can be taken up on the tanks on one trip.

The upper compartment houses the centrifuge for "shaking out" crude samples to determine cut of water. It is connected to the battery of the car and has a switch on the outside so that it is easily operated from the ground.

In operation, the pickup truck is stopped near the tank battery and the gauger takes all equipment necessary to gauge and thief the tank to the tanks in one load. He then returns and determines salt water content and makes out his gauge report at the truck.

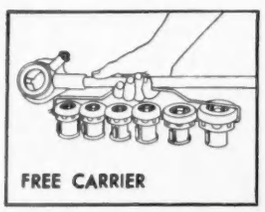
WHITNEY NATIONAL BANK
OF NEW ORLEANS

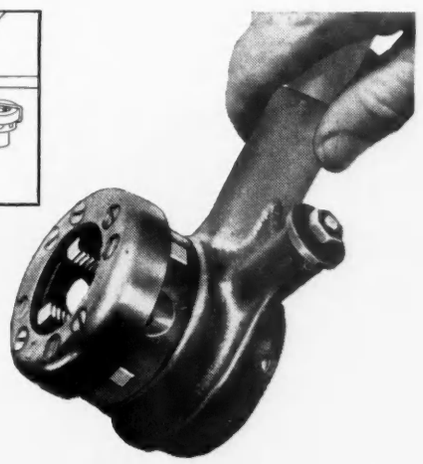
ESTABLISHED 1883

CONDENSED STATEMENT OF CONDITION
DECEMBER 30, 1950

ASSETS		LIABILITIES		
Cash and Due from Banks	$ 88,489,660.52	Deposits		$345,102,164.41
U. S. Government Obligations	151,865,907.40	Acceptances		1,031,537.48
State, Municipal and Other Public Bonds	17,405,226.85	Dividend Payable January 2, 1951		112,000.00
Other Bonds and Securities	403,068.65	Reserve for Taxes and Accrued Interest and Expenses		1,174,991.50
Loans and Discounts	103,554,140.13	Other Liabilities		74,601.01
Bank Premises	2,771,112.80	Capital Stock	$ 2,800,000.00	
Other Real Estate	159,702.30	Surplus	12,200,000.00	
Customers' Liability Account of Acceptances	890,285.78	Undivided Profits	4,180,907.62	
Accrued Income Receivable and Other Assets	1,137,097.59			19,180,907.62
TOTAL	$366,676,202.02	TOTAL		$366,676,202.02

DEPOSITARY OF THE UNITED STATES GOVERNMENT, STATE OF LOUISIANA AND CITY OF NEW ORLEANS
MEMBER OF THE FEDERAL DEPOSIT INSURANCE CORPORATION





50 Years of Friendly Service

Beaver No. 3 Ratchet Threader
For Pipe, Bolts, Conduit

Beaver No. 3 Ratchet Threader is a deluxe tool with fully-enclosed ratchet teeth that cannot get gummed-up or mutilated—thus eliminating the danger of serious accidents caused by ratchet slippage.

Die segments square in shape—no weak sections—are easily removable for sharpening and can be inverted for close threading. Ample openings between segments for oiling and chip clearance.

Diehead carrier free—enclosed metal tool-box available extra.

Beaver No. 3 threads Pipe, ⅛ to 1"; Bolts, ¼ to 1"; Conduit, ½ to 1"; Brass Tubing, ¾-20; ⅝ or ¾-27 Thread. Also specials.

Write for complete new Catalog No. 49—free! It shows a complete line of hand tools, ⅛ to 12-inch; electric pipe & bolt machines, power drives, etc.

Address Beaver Pipe Tools, Inc., 254-300 Dana Avenue, Warren, Ohio, U.S.A.

BEAVER PIPE TOOLS

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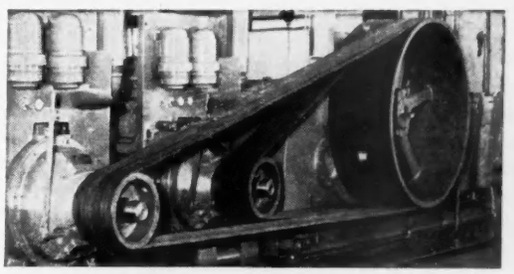
MULTI-V-DRIVE SHEAVE STOCK
AND
WORTHINGTON GOODYEAR V-BELTS

In New Orleans, Louisiana

A complete stock of sheaves and belts in A, B, C and D Sections is now available in our New Orleans Warehouse in addition to the factory stocks maintained in Houston, Ft. Worth, and Tulsa.



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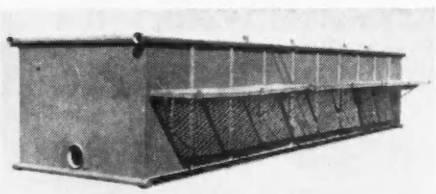

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HOW TO—Reinforce Cast Iron Elbow

Cooling water supply for a compressor station enters the pump room through a ten-inch line of cast iron pipe, the final bend being a 45-degree double-flanged ell with only about six inches clearance between bell and building wall.

This joint gave considerable trouble because it was loosened by vibration of the pipe, which was induced by pulsation and relatively soft ground which offered little support to the line. As soon as vibration opened the calking, air entered the line and suction was lost or at least seriously impaired.

To eliminate trouble at this point, two ¾-inch rods were set into the wall, bearing against plates inside the building. The outer ends of these rods, carrying long threads, were passed through the halves of a clamp which was formed to fit around the outside of the bell. By tightening the clamp on the ell, and then pulling up on the two bolts, the ell was held tightly against the spigot end of pipe protruding from the wall, and vibration was eliminated by transferring the pipe load formerly carried by the calking to the rods.

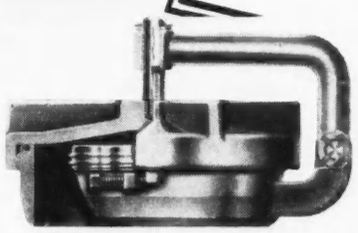
The lower end of the ell gave no trouble, as there was ample room for hammer and calking tool to be used to firm the cast lead packing against the bell and spigot and make a joint which was sufficiently rigid to withstand vibration.

For SCRAPER TRAPS . . .
• STRAINERS
• JUMPER ASSEMBLIES . . .
• MANIFOLDS . . .

Eliminate a part . . . and you eliminate a possible source of trouble!

Yale 2-PIECE Blanking Plug Unions provide longer, safer service because there are no loose parts to lose . . . no bolts to tighten . . . no heavy hammering required for sealing. They're lighter . . . easier to handle . . . faster to break out and make up.

Get the full benefit of *modern design* by using YALE 2-PIECE Blanking Plug Unions. Furnished in sizes from 4" through 32", for all liquid and gas service.



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P. O. Box 10117 Houston, Texas

***Coming Up:* World Oil's April Exploration Issue!**

World Supply and Demand

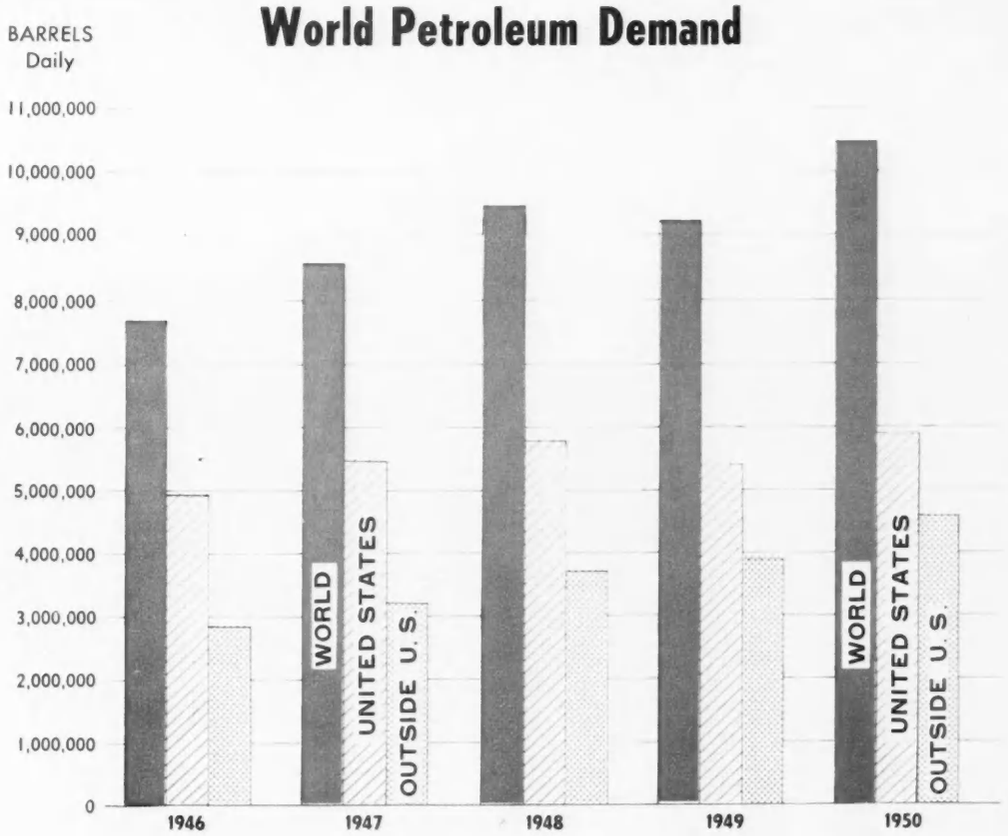
Continue Upsurge

WORLD petroleum demand increased in mid-1950 to an average of 1,257,000 barrels daily over 1949 rates, or a jump of 14 percent, the greatest upsurge in demand yet recorded.

Western Europe accounted for the greatest increase in products demand outside of the U. S., going from 521,860 to 828,258 barrels daily. Western Europe's great industrial expansion in the past year has done much to increase its need for refined products. England has seen industrial expansion and capacity reach its highest point since before the last war. France also has pulled its industries out of the postwar doldrums and has again assumed a major position in the continent's industrial picture. Western Germany has reached a high point in the manufacture of consumer goods, as have Italy and the Netherlands. Sweden has followed suit in its heavy industries, especially steel production.

World supply and demand almost reached an even balance by mid-1950 with demand being only 122,000 barrels less daily. Actually, this small differential is indicative of the great increase in demand for petroleum products, for production made a large increase in 1950 over any previous year. Venezuela surged ahead in production when its markets improved. Exports climbed from an average of 1,158,474 to 1,218,871 barrels daily and its refinery runs jumped from 145,389 to 228,903 barrels daily in the same period. Canada's domestic demand increased 26 percent from 263,216 to 331,709 barrels daily since 1949. Imports also increased in Canada despite the large increase in the dominion's domestic production.

The U. S. had an increase of 550,000 barrels daily in demand by mid-1950 as compared with the previous



YEAR	U.S. Domestic	Outside U.S.	World Total
1938	3,115,000	2,127,000	5,272,000
1939	3,373,000	2,162,000	5,535,000
1940	3,625,000	1,838,000	5,463,000
1941	4,071,000	2,528,000	6,599,000
1946	4,907,000	2,866,000	7,773,000
1947	5,451,000	3,196,000	8,647,000
1948	5,755,000	3,663,000	9,418,000
1949	5,330,189	3,836,455	9,166,644
Mid-1950	5,881,613	4,542,097	10,423,710

year's average. Production from the world's top producer and user of oil also increased 440,000 barrels daily in the same period. At mid-year, U. S. demand was 400,000 barrels greater daily than the domestic supply and the differential was covered by imports from Mexico, Venezuela and the Middle East.

In Central and South America five countries produced more oil than they consumed in 1950. They were Mexico, Colombia, Ecuador, Peru and Venezuela. Of these, only Colombia and Venezuela produced more oil than they actually needed. The other countries exported oil as a source of income even though the products could have been used at home.

The only other oil surplus region was the Middle East, where 58 percent of the output was exported because of relatively low domestic demand and because the output was so enormous. The world's chief oil exporters, Venezuela, Iran, Iraq, Kuwait, Qatar and Saudi Arabia, accounted for 31 percent of the world's oil supply and consumed only 9 percent, leaving a surplus supply of 2,494,600 barrels daily for the oil-short nations.

Venezuela feels that its markets in Europe depend to a large extent on the transport capacity from Middle East producers and as a consequence is building up a consumers market on the South American continent. This change in world oil routing will do much to build up a more favorable balance of trade in the Latin-American countries. Western Hemisphere industrialists feel that such a change is long overdue because most of South America's latent industrial expansion has been held back because of lack of oil or other sources of power.

While Middle East crude may have detoured a few supply routes, the oil from the region has done much to build up the industrial capacity of Western Europe.

Daily Average World Supply and Demand, Crude Petroleum, by Countries, July, 1950, Compared with Year 1949

Source: Based on U. S. Bureau of Mines Monthly Report, "World Petroleum Statistics."

(Barrels daily average in year 1949 and month of July 1950)

COUNTRY	PRODUCTION		IMPORTS		EXPORTS		CRUDE RUNS TO STILLS		OTHER DEMAND AND LOSSES		STOCK CHANGE	
	Bbls. Daily Year, 1949	Bbls. Daily July, 1950	Bbls. Daily Year, 1949	Bbls. Daily July, 1950	Bbls. Daily Year, 1949	Bbls. Daily July, 1950	Bbls. Daily Year, 1949	Bbls. Daily July, 1950	Bbls. Daily Year, 1949	Bbls. Daily July, 1950	Bbls. Daily Year, 1949	Bbls. Daily July, 1950
North America	**5,266,851**	**5,766,258**	**636,090**	**738,226**	**110,400**	**154,645**	**5,734,797**	**6,365,032**	**70,524**	**56,613**	**—12,778**	**—71,806**
Canada	57,562	83,129	206,710	247,806	.....	.....	263,216	331,709	822	806	+ 233	— 1,581
Cuba	476	484	4,819	4,097	.....	.....	5,389	6,129	27	129	— 120	— 1,677
Mexico	166,876	198,226	118	.....	19,800	49,806	136,003	145,581	15,121	6,323	— 3,929	— 3,484
Total N. America, Excl. U.S.	224,914	281,839	211,647	251,903	19,800	49,806	404,608	483,419	15,970	7,258	— 3,816	— 6,742
United States	5,041,937	5,484,419	424,443	486,323	90,600	104,839	5,330,189	5,881,613	54,554	49,355	— 8,962	— 65,064
South America and Caribbean	**1,572,384**	**1,800,258**	**793,027**	**874,871**	**1,246,942**	**1,313,323**	**1,100,524**	**1,252,226**	**19,668**	**23,484**	**— 1,723**	**+ 86,096**
Argentina	62,907	61,290	35,068	75,806	.....	.....	100,000	117,742	989	5,000	— 3,014	+ 14,355
Boliva	1,857	1,742	.....	.....	189	194	1,658	1,935	11	.....	.....	— 387
Brazil	299	516	1,622	.....	.....	.....	1,622	1,290	299	194	.....	— 968
Chile	301	2,000	.....	.....	293	.....	.....	.....	8	64	.....	+ 1,935
Colombia	81,430	97,903	.....	.....	56,942	55,355	23,167	26,710	1,425	2,419	— 104	+ 13,419
Ecuador	7,170	7,290	.....	.....	2,510	3,258	4,340	4,452	109	.....	+ 211	— 419
Netherlands Antilles	.....	.....	712,027	748,387	15,622	10,484	696,405	747,484	.....	.....	.....	— 9,581
Peru	40,521	40,871	.....	.....	6,455	10,161	33,660	32,839	126	129	+ 279	— 2,258
Trinidad	56,485	55,323	30,748	35,484	6,457	15,000	80,310	75,323	512	484	— 46	.....
Uruguay	.....	.....	13,562	15,194	.....	.....	13,973	15,548	.....	.....	— 411	— 355
Venezuela	1,321,414	1,533,323	.....	.....	1,158,474	1,218,871	145,389	228,903	16,189	15,194	+ 1,362	+ 70,355
Total Western Hemisphere	**6,839,235**	**7,566,516**	**1,429,117**	**1,613,097**	**1,357,342**	**1,467,968**	**6,835,321**	**7,617,258**	**90,192**	**80,097**	**—14,501**	**+14,290**
Western Europe	**30,359**	**39,903**	**499,551**	**699,581**	**260**	.....	**521,860**	**828,258**	**740**	**774**	**+ 7,049**	**—89,548**
Belgium	.....	.....	7,153	11,032	.....	.....	7,263	9,645	.....	.....	— 110	+ 1,387
Denmark	.....	.....	693	903	.....	.....	663	742	.....	.....	+ 30	+ 161
France	1,126	3,000	236,458	238,129	260	.....	230,879	298,226	206	323	+ 6,238	— 57,419
Western Germany	16,293	21,871	17,260	38,065	.....	.....	33,863	62,581	164	129	— 474	— 2,774
Italy and Trieste	195	161	60,252	100,000	.....	.....	60,729	98,065	.....	.....	— 282	+ 2,097
Netherlands	11,819	13,968	42,400	96,290	.....	.....	53,425	141,193	110	161	+ 685	— 31,097
Norway	.....	.....	.....	.....	.....	.....	.....	129	.....	.....	.....	— 129
Portugal	.....	.....	5,244	11,000	.....	.....	5,378	5,645	.....	.....	— 134	+ 5,355
Spain	.....	.....	.....	7,194	.....	.....	.....	6,000	.....	.....	.....	+ 1,194
Sweden	.....	.....	8,948	19,645	.....	.....	8,948	19,645	.....	.....	.....	.....
United Kingdom	926	903	121,143	177,323	.....	.....	120,712	186,387	260	161	+ 1,096	— 8,323
Middle East	**1,444,773**	**1,839,678**	**132,047**	**137,322**	**732,677**	**1,065,548**	**824,244**	**883,129**	**12,797**	**5,484**	**+ 7,101**	**+ 22,839**
Bahrein Island	30,096	30,258	124,195	129,645	.....	.....	153,589	150,742	214	.....	+ 488	+ 9,161
Egypt	43,458	40,194	.....	.....	.....	.....	42,660	45,677	578	258	+ 219	— 5,742
Iran and Kuwait	807,238	1,052,516	.....	.....	310,553	462,903	487,118	571,645	8,608	2,484	+ 959	+ 15,484
Iraq	84,932	126,097	.....	.....	76,255	116,355	6,115	7,355	2,561	2,387	.....	.....
Israel	.....	.....	1,616	.....	.....	.....	1,616	.....	.....	.....	.....	.....
Lebanon	.....	.....	6,236	7,677	.....	.....	6,236	7,678	.....	7,677	.....	.....
Qatar	2,055	32,032	.....	.....	315	31,935	.....	.....	41	.....	+ 1,698	.....
Saudi Arabia	476,734	558,581	.....	.....	345,554	454,355	126,767	100,032	677	100,032	+ 3,737	+ 3,936
Turkey	260	.....	.....	.....	.....	.....	143	.....	118	.....	.....	.....
Other Asia	**14,041**	**15,968**	**2,510**	**38,387**	.....	.....	**15,532**	**38,742**	**994**	**387**	**+ 25**	**+ 15,226**
China	2,060	1,613	2,510	.....	.....	.....	4,364	1,516	205	97	.....	.....
India, Burma and Pakistan	8,274	8,645	.....	.....	.....	.....	7,658	8,516	616	129	.....	.....
Japan	3,707	5,710	.....	38,387	.....	.....	3,510	28,710	173	161	+ 25	+ 15,226
Other Africa	**373**	**903**	**12,356**	**14,516**	.....	.....	**11,772**	**17,839**	**82**	**97**	**+ 874**	**— 2,516**
Canary Islands	.....	.....	12,356	14,516	.....	.....	11,482	17,258	.....	.....	+ 874	— 2,742
French Morocco	373	903	.....	.....	.....	.....	290	581	82	97	.....	+ 226
Oceania	**191,893**	**237,742**	**11,055**	**13,000**	**13,699**	**29,613**	**186,819**	**215,806**	**2,332**	**2,903**	**+ 99**	**+ 2,419**
Australia	3	.....	11,055	13,000	.....	.....	10,959	13,000	.....	.....	+ 99	.....
British Borneo	68,789	87,742	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Indonesia	123,101	150,000	.....	.....	13,699	29,613	175,860	202,806	2,332	2,903	.....	+ 2,419
Total Above Countries	**8,520,674**	**9,700,710**	**2,086,636**	**2,515,903**	**2,103,978**	**2,563,129**	**8,395,548**	**9,601,032**	**107,137**	**89,742**	**+ 647**	**—37,290**
U.S.S.R. and Eastern Europe	**788,068**	**845,000**	**3,013**	**3,000**	.....	.....	**771,096**	**822,678**	**19,986**	**25,323**	.....	.....
U.S.S.R.	658,000	725,000	.....	.....	.....	.....	640,000	704,678	18,000	20,323	.....	.....
Other Eastern Europe	130,068	120,000	3,013	3,000	.....	.....	131,096	118,000	1,986	5,000	.....	.....
Total Eastern Hemisphere	**2,469,507**	**2,979,194**	**660,532**	**905,806**	**746,636**	**1,095,161**	**2,331,323**	**2,806,452**	**36,931**	**34,968**	**+15,148**	**—51,580**
Total World Outside U.S.	**4,266,805**	**5,061,291**	**1,665,206**	**2,032,580**	**2,013,378**	**2,458,290**	**3,836,455**	**4,542,097**	**72,569**	**65,710**	**+ 9,609**	**+27,774**
WORLD TOTAL	**9,308,742**	**10.545,710**	**2,089,649**	**2,518,903**	**2,103,978**	**2,563,129**	**9,166,644**	**10,423,710**	**127,123**	**115,065**	**+ 647**	**—37,290**

World Crude Reserves

Up 41 Percent in Five Years

PROVEN world crude reserves increased from 67,365,963,000 barrels January 1, 1946, to 95,208,124,000 at the beginning of this year. This is a gain of slightly more than 27.8 billion barrels, 41 percent, in five years. This is a remarkable expansion of reserves for such a short period of time and the most notable feature is the great increase in the Middle East.

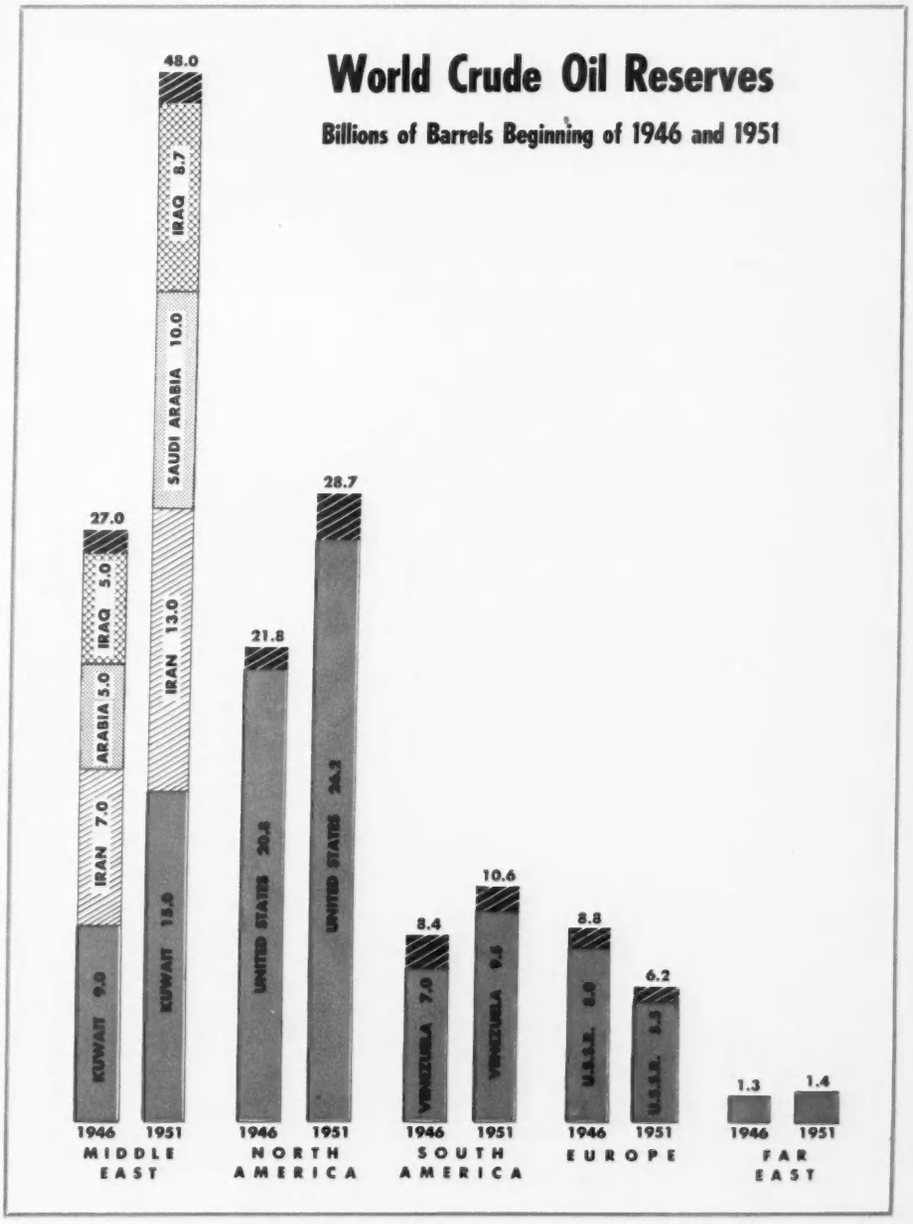
The seven countries, or sheikdoms, considered a part of the Middle East area now have reserves in excess of 48 billion barrels—over half the world total. Carrying this comparison further, the Middle East has almost twice as much proved reserves as the U. S., or five times as much as Venezuela, world's second largest oil producer. Kuwait, with an area slightly smaller than New Jersey, has over half as much proved oil reserves as the entire U. S.

Five years ago the Middle East had reserves of 27 billion, or 40 percent of the world total, and today the area contains 50.4 percent of the total. The little giant, Kuwait, has 31 percent of the Middle East and 15.8 percent of the world reserves. This one tiny sheikdom, with a total area of only 6000 miles, has more reserves than all of South America plus Canada and Mexico, with all of the Far East thrown in for good measure.

Iran is the present top producer in the Middle East and is second in reserves with 27 percent of the area and 13.7 percent of the world total. Saudi Arabia, with 21 percent of the area and 10.5 percent of the world total reserves, is the Middle East's second largest producer.

In terms of reserve increases for the Middle East countries in the past five years, Kuwait increased from 9 to 15 billion barrels, or 67 percent; Iran increased from 7 to 13 billion barrels, or 86 percent; Saudi Arabia increased from 4.7 to 10 billion barrels, or 113 percent; and Iraq increased from 5 to 8.7 billion barrels, or 74 percent. Qatar, which only began producing oil late in 1949, may soon come to the fore as a major reserves area. As it now stands the tiny sheikdom has reserves almost equal to those of Canada.

Other areas of the world have not made the spectacular gains in oil reserves noted for the Middle East. For example, reserves in the U. S., the largest producing country, increased from 20.8 billion to 26.2 billion barrels in the past five years—a gain of 26 percent. The U. S. now contains 27.5 percent of the world total or a little less than the combined reserves of Kuwait, and Iran. While the Middle East area surpasses all others in total reserves, it should be remembered that the U. S. has already produced 40.9 billion barrels of oil since 1859—an amount almost equal to the Middle East's present reserves. The Middle East has produced only 4 billion bar-



rels of its enormous reserves. Considering the length of time the U. S. has been in the oil business, and its high rate of production, the country is doing a good job of maintaining reserves well above consumption. The U. S. annually produces more than 7 percent of its known reserves while the Middle East produces only 1 percent.

Venezuela increased its reserves from 7 to 9.5 billion barrels in the past five years—an increase of 36 percent. This places the second largest oil producing country about equal in reserves to Saudi Arabia, the fifth largest producing country. Venezuela now contains 10 percent of the world reserves, while five years ago the figure was only slightly higher.

Canada came into the world oil picture in the past four years following the Leduc discovery in 1947. Five years ago Canada's oil reserves were about 72 million barrels as compared with the 1.2 billion barrel figure now used. This is not only an increase of 1566 percent in a very short time, it is also probably just the beginning of a greatly expanded oil supply on the North American continent.

Added reserves mean Canada can reduce its purchase of such products from other countries and thus improve its economy. About 3 billion barrels of reserves will make Canada self-sufficient in oil, and it is toward this goal the country is moving. Canada now purchases much of its oil from Venezuela so that increased domestic production will decrease Venezuela imports and for this reason the two countries' oil economies are closely related.

Mexico's reserves have increased from 950 million to 1.3 billion barrels in the past five years, or about 37 percent. Most of this increase has been the result of expansion of existing fields of tremendous productive potential. One field alone has produced more than 1 billion barrels since its discovery in 1908. Mexico's chief problem at present is the finding and development of new oil areas to boost reserves, or at least maintain them at the present level. The need for this can be better recognized when it is seen that the world's seventh oil producing country contains only 1.37 percent of the total reserves. Mexico bases a large part of its economy on oil exports and it would be reluctant to reduce this trade. The past year has seen a marked stepup in exploratory work and a few new potential producing areas have been tentatively located. If this work continues, or increases, the reserve figures of Mexico five years hence may be quite substantial.

Other than Venezuela, the South American countries have made little progress in reserves buildup. In fact, most of the countries have experienced a decrease in reserves over the figures estimated five years ago. The two bright spots on the continent for reserves are Chile and Brazil. The former country began producing oil in 1949 and its estimated reserves have increased from 50,000 to 30 million barrels since 1946. This tremendous increase in reserves is typical of a new oil producing area, but from all indications the country's oil future is bright.

Brazil is also credited with a large increase in reserves, going from 1 million to 26 million barrels in five years. While this increase is based on a recent discovery of major importance in an old producing area most of the estimate is based upon the potential of the vast Amazon River sedimentary basin, which is only now being explored actively.

Most of the Russian-controlled oil countries of Europe are credited with a reserve decline. The estimate is based both on the production decline from these countries in the past five years and the inept production practices employed which reasonably will reduce the ultimate recovery from the fields in question.

The unproved reserves of the USSR are believed to be quite tremendous, but for the purposes of this report the proved reserves are in line with the limited information available.

Estimated World Crude Oil Reserves, by Countries

(THOUSANDS OF BARRELS)

CONTINENT and COUNTRY	ESTIMATED RESERVES		ANNUAL PRODUCTION		Ratio of Reserves to Annual Prod. (Years' Supply)
	Thousand Barrels Jan. 1, 1951	Percent of World	Thousand Bbls. in 1950	Percent of World	
North America	**28,722,224**	**30.17**	**2,048,179**	**54.55**	**14.0**
Alaska	500	.....	.....	.....	.....
Canada	1,200,000	1.26	29,359	0.78	40.9
Cuba	4,000	.....	68	.....	58.8
Mexico	1,300,000	1.37	71,967	1.92	18.1
*United States	26,217,724	27.54	1,946,785	51.85	13.5
South America	**10,650,000**	**11.19**	**638,078**	**16.98**	**16.7**
Argentina	270,000	0.28	23,108	0.62	11.7
Bolivia	23,000	0.02	609	0.02	37.8
Brazil	26,000	0.03	276	0.01	94.2
Chile	30,000	0.04	587	.....	51.2
Colombia	375,000	0.39	33,640	0.89	11.1
Ecuador	26,000	0.03	2,564	0.07	10.1
Peru	150,000	0.16	14,646	0.39	10.2
Trinidad	250,000	0.26	20,247	0.54	12.3
Venezuela	9,500,000	9.98	542,401	14.44	17.5
Europe	**6,206,700**	**6.52**	**322,526**	**8.59**	**19.2**
Albania	20,000	0.02	2,106	0.06	9.5
Austria	60,000	0.06	6,205	0.17	9.7
Czechoslovakia	2,500	.....	280	0.01	8.9
England	3,400	.....	337	0.01	10.1
France	14,400	0.02	857	0.02	16.8
Germany, West	160,000	0.17	7,830	0.21	20.4
Hungary	35,000	0.04	3,460	0.09	10.1
Italy	2,200	.....	67	.....	32.8
Netherlands	53,000	0.06	5,193	0.14	10.2
Poland	12,000	0.01	928	0.02	12.9
Roumania	340,000	0.36	31,609	0.84	10.8
U.S.S.R. (Russia)	5,500,000	5.78	263,165	7.01	16.7
Yugoslavia	4,200	.....	489	0.01	8.6
Africa	**183,200**	**0.19**	**16,569**	**0.44**	**11.1**
Algeria	1,000	.....	.....	.....	.....
Egypt	180,000	0.19	16,275	0.43	11.0
Morocco	2,200	.....	294	0.01	7.5
Asia, Total	**49,445,500**	**51.93**	**729,589**	**19.43**	**67.8**
Asia, Middle East	**48,010,000**	**50.42**	**635,415**	**16.93**	**75.6**
Bahrein	300,000	0.32	11,008	0.29	27.3
Iran (Persia)	13,000,000	13.65	240,076	6.40	54.1
Iraq	8,700,000	9.14	47,338	1.26	183.8
Kuwait	15,000,000	15.75	125,122	3.33	119.9
Qatar	1,000,000	1.05	11,457	0.31	87.3
Saudi Arabia	10,000,000	10.50	200,314	5.34	49.9
Turkey	10,000	0.01	100	.....	100.0
Asia, Far East	**1,435,500**	**1.51**	**94,174**	**2.51**	**15.2**
Borneo, British (Sarawak and Brunei)	250,000	0.26	29,700	0.79	8.4
Burma	48,000	0.05	518	0.01	92.7
China	10,000	0.01	803	0.02	12.4
India	15,000	0.02	3,051	0.08	4.9
Formosa	500	.....	24	.....	20.8
Japan	22,000	0.03	2,000	0.06	11.0
Netherlands India	1,000,000	1.05	49,563	1.32	20.2
Pakistan	20,000	0.02	1,515	0.04	13.2
Sakhalin	70,000	0.07	7,000	0.19	10.0
Australia—New Zealand	**500**	**0.00**	**8**	**0.00**	**62.5**
Total, World	**95,208,124**	**100.00**	**3,754,949**	**100.00**	**25.4**

* U. S. Crude Oil only; not including Natural Gas Liquids.

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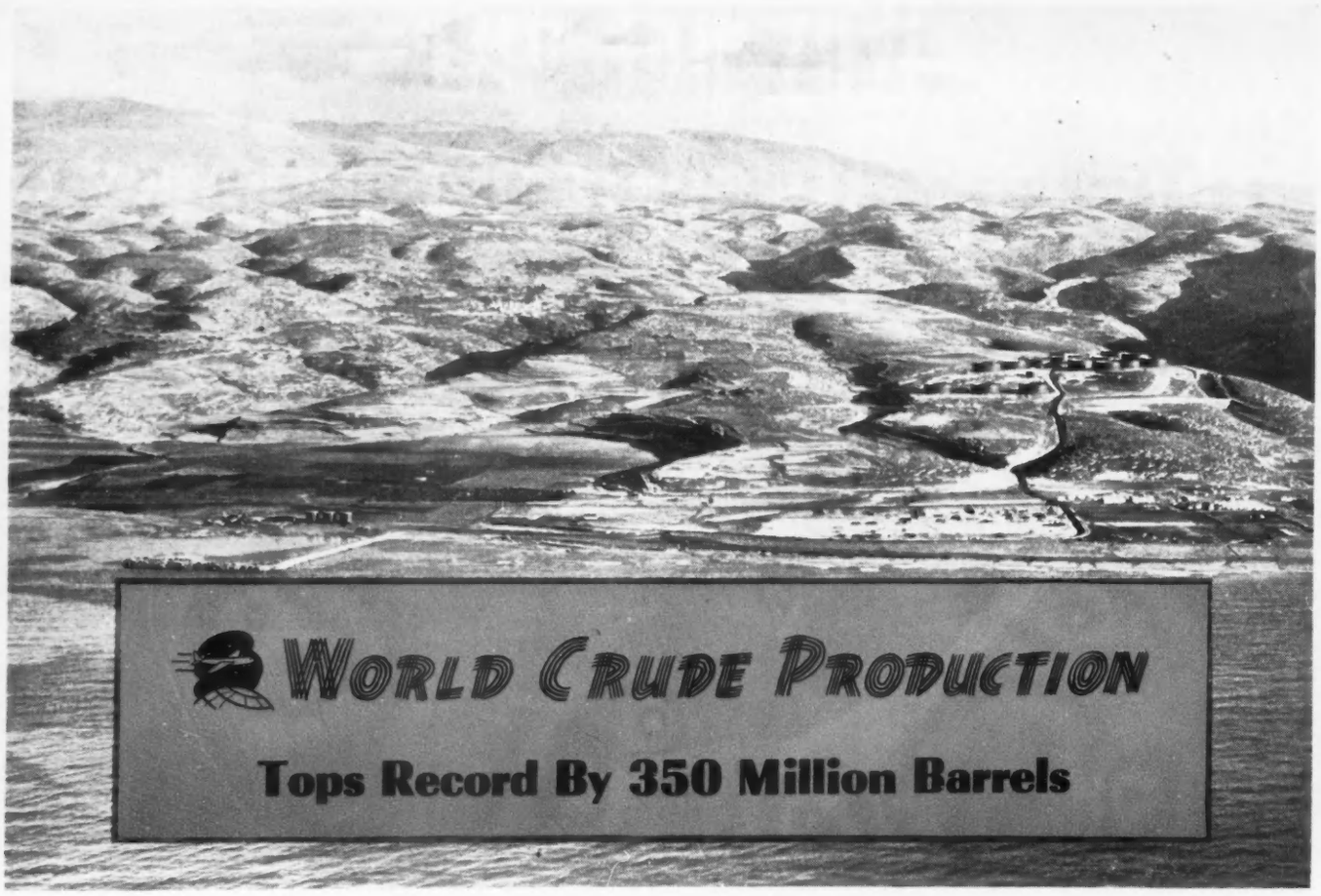


World Crude Production

Tops Record By 350 Million Barrels

By MARK OLSON

International Editor

A NEW world crude production record of 3,780,973,000 barrels was set in 1950, topping the all-time record of 1948 of 3,433,021,000 barrels by 350 million barrels. Production for the first time surpassed 10 million barrels per day.

In daily averages, the 1950 figure of 10,359,100 barrels topped the previous year by 1,048,300 barrels and the previous all-time high by 953,000 barrels. The gain of 11 percent in 1950 more than offset the 1 percent loss of the previous year and returned world production to an even keel.

At the end of 1950, world crude output continued to gain at a rate that pointed to another record in 1951. Demand for petroleum products is up in all quarters and in view of the world situation politically no slackening in this respect is in sight. Venezuela is again finding better markets for its heavy crude and reached a record porduction in 1950 with an increase of more than 160,000 barrels daily over the previous year. Venezuela's markets will probably improve further despite the bite taken out of some European markets by enlarged Middle East crude. For one thing, the South American markets are expanding for Venezuelan crude and the country's old customers in Europe are using more oil.

The U. S., while increasing output in 1950 over the previous year, is still dropping in percent of the world total. The 5,405,000 barrels produced daily in 1950 was the result of the second highest production year for the world's leader. With a total production of 1,972,809,000 barrels last year, the U. S. almost equaled the top 1948 production when 2,020,185,000 barrels resulted, but percentagewise the U. S. dropped from 58.9 of the world total to 52.2 during the two-year period.

While the Venezuelan output increased 12.5 percent in 1950, the giant Middle East fields increased production 24.2 percent, about the same amount as the previous year's increase.

ABOVE PHOTO: TAPline's Mediterranean terminal, near Sidon, Lebanon, looking shoreward. The 30-31-inch pipe line approaches the sixteen 188,000-barrel capacity storage tanks from the mountain slopes in the right background. Tankers are loaded by submarine lines in the left foreground, outside the stone jetty shown. December 2, 1950, was the first day oil was loaded into tankers from the terminal.

Middle East Growth

The Middle East continues its fabulous growth in oil production. While the present production of the area is slightly less than that of South America, it is held back because of inadequate transportation facilities. The huge TAPline, which went into operation late in 1950, will move 300,000 barrels of oil daily from Saudi Arabia to the Mediterranean. This big-inch line, 1068 miles long, will release about 30 charter tankers which for-

merly hauled the oil 5500 miles around the Arabian peninsula. It is reasonable to expect Saudi Arabia's daily average production of 548,800 barrels in 1950 to be increased this year with more rapid movement of oil possible with the pine line. Then too, the released tankers may be used by other Middle East countries not having pipe line outlets to the Mediterranean so that their production will increase substantially. At present most of the countries are producing much more than last year's daily average. It is entirely possible that improved transport will allow the Middle East to approximate the 2 million barrel daily mark this year and become the world's second producing area.

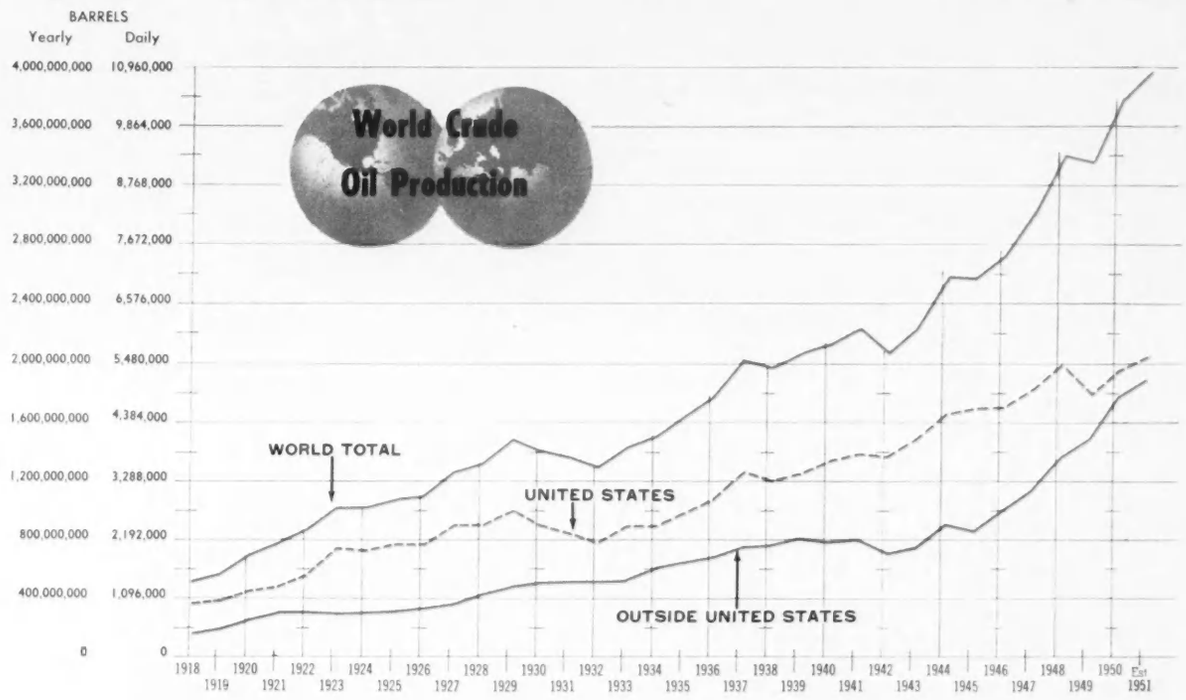
In 1953 the huge potential of Iraq will swell the Middle East total when a new big-inch pipe line is completed from that country to the Mediterranean. With this additional line, Iraq plans to move 131 million barrels annually to the Mediterranean instead of the present 47 million. This would increase the area daily total by 230,000 barrels. Iran and Kuwait will, in all probability, boost their outputs in the meantime. While these developments are in the realm of the future, the Middle East had a banner production year in 1950.

Iran Production

Iran continued as the Middle East's top producer with 657,742 barrels daily during 1950, but Saudi Arabia placed a close second with 548,806 barrels daily. These averages represent about 16 percent gains for each country, while Iraq increased its production from 84,932 to 129,693 barrels daily, or a 52.7 percent increase, and Qatar posted a 1427.4 percent gain, going from 2055 to 31,389 barrels daily.

Kuwait, with an area smaller than New Jersey, produced an average of 342,800 barrels of oil daily in 1950 as compared with 246,575 barrels the year before. This 39 percent increase for the third ranking oil country in the Middle East is actually a small gain in view of the amount Kuwait could produce. But for transportation bottlenecks the sheikdom could be the top producing country of the Middle East on the basis of present development and reserves.

Ten years ago the Middle East produced 102,691,000 barrels annually as compared with 635,415,000 in 1950. This is a phenomenal increase for any area of the world and, although Kuwait, Qatar and Turkey



(All Figures in Barrels)

YEAR	WORLD Annual Total	WORLD Daily Average	UNITED STATES Annual Total	UNITED STATES Daily Average	OUTSIDE U.S.A. Annual Total	OUTSIDE U.S.A. Daily Average
1918	503,515,000	1,378,000	355,928,000	975,000	147,587,000	403,000
1919	555,875,000	1,523,000	378,367,000	1,037,000	177,508,000	486,000
1920	688,884,000	1,887,000	442,929,000	1,213,000	245,955,000	674,000
1921	766,002,000	2,098,000	472,183,000	1,294,000	293,819,000	804,000
1922	858,898,000	2,353,000	557,531,000	1,528,000	301,367,000	825,000
1923	1,015,736,000	2,783,000	732,407,000	2,007,000	283,329,000	776,000
1924	1,014,318,000	2,779,000	713,940,000	1,956,000	300,378,000	823,000
1925	1,068,933,000	2,928,000	763,743,000	2,092,000	305,190,000	836,000
1926	1,096,823,000	3,005,000	770,874,000	2,112,000	325,949,000	893,000
1927	1,262,582,000	3,459,000	901,129,000	2,469,000	361,453,000	990,000
1928	1,324,774,000	3,629,000	901,474,000	2,469,000	423,300,000	1,160,000
1929	1,485,867,000	4,071,000	1,007,323,000	2,760,000	478,544,000	1,311,000
1930	1,410,037,000	3,863,000	898,011,000	2,460,000	512,626,000	1,403,000
1931	1,372,532,000	3,760,000	851,081,000	2,332,000	521,451,000	1,428,000
1932	1,309,677,000	3,588,000	785,159,000	2,151,000	524,518,000	1,437,000
1933	1,442,146,000	3,951,000	905,656,000	2,481,000	536,490,000	1,470,000
1934	1,522,281,000	4,170,000	908,065,000	2,488,000	614,216,000	1,682,000
1935	1,654,488,000	4,532,000	996,596,000	2,730,000	657,892,000	1,802,000
1936	1,791,540,000	4,908,000	1,099,687,000	3,013,000	691,853,000	1,895,000
1937	2,039,231,000	5,587,000	1,279,160,000	3,505,000	760,071,000	2,082,000
1938	1,988,041,000	5,446,000	1,214,355,000	3,327,000	773,686,000	2,119,000
1939	2,086,160,000	5,715,500	1,264,962,000	3,465,600	821,198,000	2,249,900
1940	2,149,821,000	5,873,800	1,353,214,000	3,697,300	796,607,000	2,176,500
1941	2,220,657,000	6,084,000	1,402,228,000	3,841,700	818,429,000	2,242,300
1942	2,093,100,000	5,734,500	1,386,645,000	3,799,000	706,455,000	1,935,500
1943	2,256,637,000	6,182,600	1,505,613,000	4,124,900	751,034,000	2,057,700
1944	2,592,371,000	7,102,400	1,677,904,000	4,584,400	914,467,000	2,518,000
1945	2,594,798,000	7,109,000	1,713,655,000	4,694,900	881,143,000	2,414,100
1946	2,745,474,000	7,521,800	1,733,939,000	4,750,500	1,011,535,000	2,771,300
1947	3,022,075,000	8,279,700	1,856,987,000	5,087,600	1,165,088,000	3,192,100
1948	3,433,021,000	9,405,500	2,020,185,000	5,519,600	1,412,836,000	3,885,900
1949	3,398,455,000	9,310,800	1,840,307,000	5,041,900	1,558,148,000	4,268,900
1950	3,780,973,000	10,359,100	1,972,809,000	5,405,000	1,808,164,000	4,954,100
1951 est.	4,001,073,000	10,961,800	2,092,000,000	5,731,500	1,909,073,000	5,230,300

did not produce in 1940, Kuwait is the only country of the three which increased the area's output to any great extent.

Also noteworthy is that ten years ago the Middle East produced only 4.8 percent of the world's total, while in 1950 it produced 16.8 percent. It is possible this percentage will double in the next ten years at the rate the area is developing.

Turkey has not yet developed its oil resources to the extent the geologic data warrant. This has been due largely to lack of funds and equipment and the country may well develop a good domestic supply if these two obstacles are overcome.

Egypt did not increase its production in 1950 on the order anticipated, and some of the slump is credited to the country's increasing trend to a nationalized oil industry. Foreign companies in the country were inclined to retrench normal exploratory activities and this slowdown may be more pronounced this year unless their position is clarified.

North America Had Good Year

Generally, North American oil countries showed an increase for the year along the lines anticipated. Canada did not make the spectacular increase in 1950 that was recorded the previous year but it could have if market outlets had been available. The over-all daily average increased from 60,877 to 80,436 barrels, and at one time during 1950 Canadian output approached the 100,000-barrel daily mark when the Interprovincial pipe line was first opened. In all respects, 1950 was Canada's greatest oil year, due almost entirely to activity in Alberta, and the country is expected to forge ahead rapidly in all departments. The past year would have been a much better year for Canada if the Interprovincial pipe line to eastern markets had existed throughout the year. At its present rate of drilling and new discoveries, Canada's potential productivity will

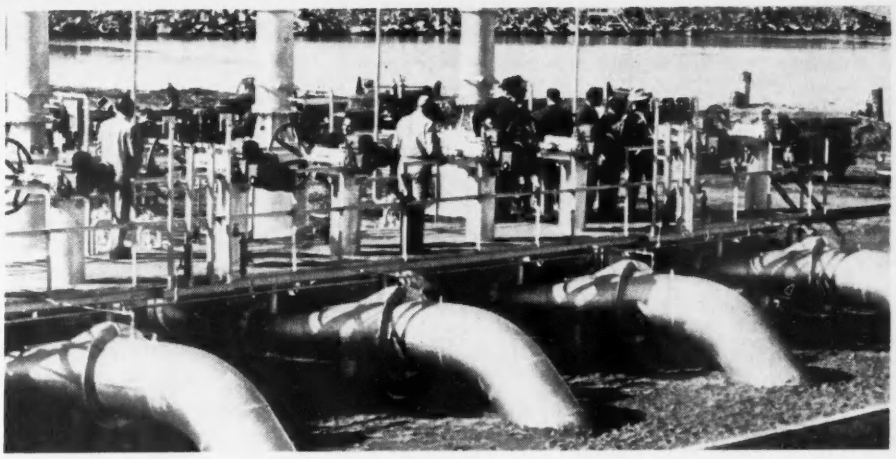
World Crude Oil Production, by Countries, in 1949 and 1950, and Cumulative Production Through 1950

(Sources: U. S. Bureau of Mines except 1950 from private sources or estimated by World Oil)

	ANNUAL PRODUCTION (Thousands of Barrels)		DAILY AVERAGE PRODUCTION (Actual Barrels)			YEAR'S PRODUCTION As Percent of World		CUMULATIVE PRODUCTION TO January 1, 1951 (Thousands of Barrels)	
CONTINENT and COUNTRY	1949	1950	1949	1950	% Diff. '49-'50	1949	1950	Total	As % of World
North America	**1,923,643**	**2,074,203**	**5,270,255**	**5,682,748**	**+ 7.8**	**56.60**	**54.84**	**43,593,470**	**66.52**
Canada	22,220	29,359	60,877	80,436	+ 32.1	0.65	0.78	192,709	0.30
Cuba	206	68	564	186	— 67.0	0.01	.....	2,193	.....
Mexico	60,910	71,967	166,877	197,170	+ 18.2	1.79	1.90	2,481,878	3.79
United States	1,840,307	1,972,809	5,041,937	5,404,956	+ 7.2	54.15	52.16	40,916,690	62.43
South America	**573,865**	**638,078**	**1,572,233**	**1,748,433**	**+ 11.1**	**16.89**	**16.89**	**7,379,199**	**11.26**
Argentina	22,961	23,108	62,907	63,310	+ 0.6	0.68	0.61	458,297	0.70
Barbadoes	.....	.....	.....	.....	.....	.....	.....	8	.....
Bolivia	678	609	1,857	1,669	— 10.1	0.02	0.02	5,580	0.01
Brazil	109	276	299	756	+ 152.8	.....	0.01	916	.....
Chile	55	587	151	1,608	.....	.....	0.02	642	.....
Colombia	29,722	33,640	81,430	92,164	+ 13.2	0.87	0.89	504,595	0.77
Ecuador	2,617	2,564	7,170	7,025	— 2.0	0.08	0.07	48,962	0.08
Peru	14,790	14,646	40,520	40,126	— 1.0	0.44	0.39	401,123	0.61
Trinidad	20,617	20,247	56,485	55,471	— 1.8	0.61	0.53	412,712	0.63
Venezuela	482,316	542,401	1,321,414	1,486,030	+ 12.4	14.19	14.35	5,546,364	8.46
Europe	**291,155**	**322,526**	**797,685**	**883,633**	**+ 10.8**	**8.57**	**8.53**	**8,374,238**	**12.78**
Albania	2,188	2,106	5,995	5,770	— 3.8	0.06	0.06	17,468	0.03
Austria	6,100	6,205	16,712	17,000	+ 1.7	0.18	0.16	64,126	0.10
Czechoslovakia	292	280	800	767	— 4.1	0.01	0.01	4,713	0.01
France	411	857	1,126	2,348	+ 108.5	0.01	0.02	15,261	0.02
Germany	5,947	7,830	16,293	21,452	+ 31.7	0.18	0.21	106,577	0.16
Great Britain	338	337	926	923	— 0.3	0.01	0.01	4,807	0.01
Hungary	3,791	3,460	10,386	9,479	— 8.7	0.11	0.09	49,524	0.07
Italy	71	67	195	184	— 5.7	.....	.....	3,558	0.01
Netherlands	3,912	5,193	10,718	14,227	+ 32.7	0.12	0.14	14,011	0.02
Poland	965	928	2,644	2,543	— 3.8	0.03	0.02	279,381	0.43
Roumania	33,700	31,609	92,329	86,600	— 6.2	0.99	0.84	1,257,195	1.92
U. S. S. R. (Russia)	233,000	263,165	638,356	721,000	+ 12.9	6.86	6.96	6,555,013	10.00
Yugoslavia	440	489	1,205	1,340	+ 11.2	0.01	0.01	2,604	.....
Africa	**16,133**	**16,569**	**44,200**	**45,394**	**+ 2.7**	**0.47**	**0.44**	**153,787**	**0.23**
Algeria	.....	.....	.....	.....	.....	.....	.....	143	.....
Egypt	15,997	16,275	43,827	44,589	+ 1.7	0.47	0.43	152,777	0.23
Morocco	136	294	373	805	+ 115.8	.....	0.01	867	.....
Asia, Total	**593,651**	**729,589**	**1,626,441**	**1,998,874**	**+ 22.9**	**17.47**	**19.30**	**6,034,426**	**9.21**
Asia, Middle East	**511,550**	**635,415**	**1,401,507**	**1,740,863**	**+ 24.2**	**15.05**	**16.81**	**4,009,489**	**6.12**
Bahrein	10,985	11,008	30,096	30,159	+ 0.2	0.33	0.29	120,908	0.18
Iran	204,712	240,076	560,855	657,742	+ 17.3	6.02	6.35	2,383,454	3.64
Iraq	31,000	47,338	84,932	129,693	+ 52.7	0.91	1.25	489,574	0.75
Kuwait	90,000	125,122	246,575	342,800	+ 39.0	2.65	3.31	283,778	0.43
Qatar	750	11,457	2,055	31,389	+1427.6	0.02	0.31	12,207	0.02
Saudi Arabia	174,008	200,314	476,734	548,806	+ 1.51	5.12	5.30	719,373	1.10
Turkey	95	100	260	274	+ 5.4	.....	.....	195	.....
Asia, Far East	**82,101**	**94,174**	**224,934**	**258,011**	**+ 14.7**	**2.42**	**24.9**	**2,024,937**	**3.09**
Borneo, British (Sarawak and Brunei)	25,108	29,700	68,789	81,370	+ 18.3	0.74	0.79	213,580	0.33
Burma	316	518	866	1,419	+ 63.9	0.01	0.01	.....	.....
India	1,894	3,015	5,189	8,359	+ 61.1	0.06	0.08	344,521	0.52
Pakistan	746	1,515	2,044	4,151	+ 103.1	0.02	0.04	.....	.....
China	730	803	2,000	2,200	+ 10.0	0.02	0.02	4,830	0.01
Formosa (Taiwan)	22	24	60	66	+ 10.0	.....	.....	309	.....
Japan	1,353	2,000	3,707	5,479	+ 47.8	0.04	0.50	98,397	0.15
Netherlands Indies	44,932	49,563	123,101	135,789	+ 10.3	1.32	1.31	1,269,060	1.94
Sakhalin	7,000	7,000	19,178	19,178	.....	0.21	0.19	94,240	0.14
Australia-New Zealand	**8**	**8**	**22**	**22**	.....	.....	.....	**59**	.....
World, Undistributed	.....	.....	.....	.....	.....	.....	.....	**1,044**	.....
TOTAL WORLD	**3,398,455**	**3,780,973**	**9,310,836**	**10,359,104**	**+ 11.2**	**100.00**	**100.00**	**65,536,223**	**100.00**

exceed its transport capacity for some years to come. It is estimated that 3 billion barrels of oil reserves will make Canada self-sufficient in petroleum and the Dominion closed 1950 with proved reserves in excess of 1.2 billion barrels. When it is remembered that 95 percent of these reserves were developed in the past four years, it is apparent that Canada's oil future is bright. Despite a less spectacular productive year in terms of percentage gain, the Dominion posted a 20 percent gain in reserves the last quarter of 1950 after nine months of seemingly futile exploration.

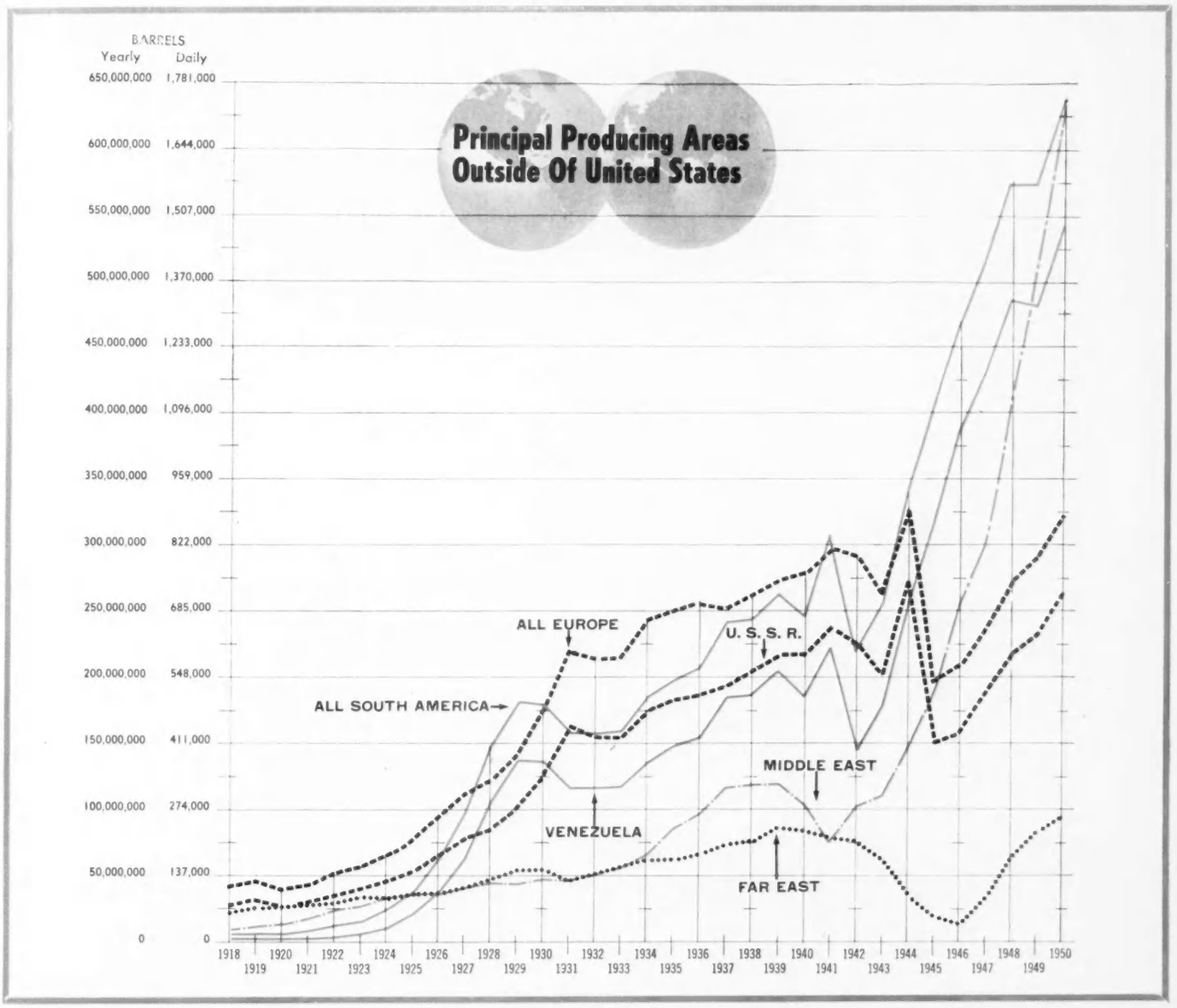
Mexico also posted a substantial gain in production over 1949 in reaching 71,967,000 barrels, highest output since 1926. The percentage increase in daily production was 18.2 over 1949. Fast approaching the 200,000-barrel daily figure, Mexico produces 83 percent of the total from the Tampico Embayment area, which includes the lush Poza Rica, Panuco-Ebano, Golden Lane and Moralillo fields. Increased production in the peninsular country was due largely to stepped up development drilling in these four fields as well as several scattered new discoveries during 1950.



Four flow lines at the TAPline's terminal control movement of oil from storage in the foothills to the tankers which anchor offshore in the background. Between December 2 and January 10, forty tankers loaded 5,825,280 barrels through these lines.

Mexico's oil future depends largely on finding the new oil areas which are believed to underlie the country's vast sedimentary basins. These new areas must be found to take the burden off the present overworked old fields. This exploratory work has been

(Continued on Page 248. See Tables on 240-244-246.)



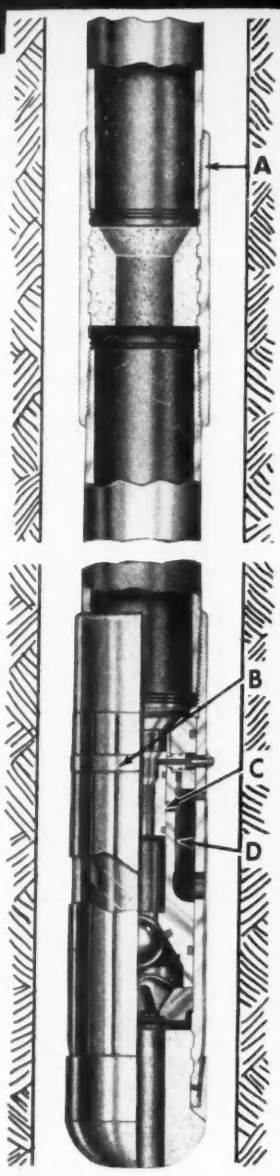
World Crude Oil Production, By Countries, By Years (Part 1)

(Complete production history of world, in thousands of barrels of 42 U. S. Gallons. Sources: *Mineral Resources and Minerals Yearbook*, except as otherwise indicated)

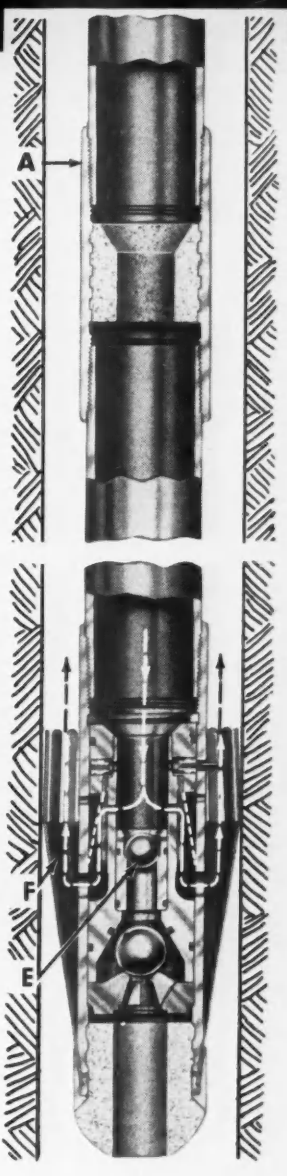
YEAR	WORLD TOTAL	Percent Produced by U.S.	NORTH AMERICA					SOUTH AMERICA										
			Canada	Mexico	United States	Cuba	Total North America	Argentina	Barbados	Bolivia	Brazil	Chile	Colombia	Ecuador	Peru	Trinidad	Venezuela	Total South America
1857	2																	
1858	4																	
1859	6	31			2		2											
1860	509	98			500		500											
1861	2,131	99			2,114		2,114											
1862	3,092	99	12		3,057		3,069											
1863	2,763	94	83		2,611		2,694											
1864	2,304	92	90		2,116		2,206											
1865	2,716	92	110		2,498		2,608											
1866	3,899	92	175		3,598		3,773											
1867	3,709	90	190		3,347		3,537											
1868	3,990	91	200		3,646		3,846											
1869	4,696	90	220		4,215		4,435											
1870	5,799	91	250		5,261		5,511											
1871	5,730	91	270		5,205		5,475											
1872	6,877	92	308		6,293		6,601											
1873	10,838	91	365		9,894		10,259											
1874	11,933	92	169		10,927		11,096											
1875	9,977	88	220		8,788		9,008											
1876	11,051	83	312		9,133		9,445											
1877	15,754	85	312		13,350		13,662											
1878	18,417	84	312		15,397		15,709											
1879	23,601	84	575		19,914		20,489											
1880	30,018	88	350		26,286		26,636											
1881	31,993	86	275		27,661		27,936											
1882	35,704	85	275		30,350		30,625											
1883	30,255	78	250		23,450		23,700											
1884	35,969	67	250		24,218		24,468											
1885	26,765	59	250		21,859		22,109											
1886	47,243	59	584		28,065		28,649											
1887	47,807	59	526		28,283		28,809											
1888	52,165	53	695		27,612		28,307											
1889	61,507	57	705		35,164		35,869											
1890	76,633	60	795		45,824		46,619											
1891	91,100	60	755		54,293		55,048											
1892	88,739	57	780		50,515		51,295											
1893	92,038	53	798		48,431		49,229											
1894	89,337	55	829		49,344		50,173											
1895	103,692	51	726		52,892		53,618											
1896	114,199	53	727		60,960		61,687											
1897	121,992	50	710		60,476		61,186								47			47
1898	124,979	44	758		55,364		56,122								71			71
1899	131,147	44	808		57,071		57,879								71			71
1900	149,137	43	913		63,621		64,534								89			89
1901	167,440	41	757	10	69,389		70,156								274			274
1902	181,809	49	531	40	88,767		89,338								275			275
1903	194,879	52	487	75	100,461		101,023								287			287
1904	217,948	54	553	126	117,081		117,760								278			278
1905	215,091	63	634	251	134,717		135,602								290			290
1906	213,263	59	569	502	126,494		127,565								373			373
1907	263,957	63	789	1,005	166,095		167,889	B							531			531
1908	285,287	63	528	3,933	178,527		182,988	12							751			751
1909	298,709	61	421	2,714	183,171		186,306	18							945	B		957
1910	327,763	64	316	3,634	209,557		213,507	20							1,411	57		1,486
1911	344,361	64	291	12,553	220,449		233,293	13							1,258	143		1,421
1912	352,443	63	242	16,558	222,935		239,736	47							1,465	285		1,763
1913	385,345	64	228	25,696	248,446		274,370	131							1,752	437		2,236
1914	407,544	65	215	26,235	265,763		292,213	276							2,071	504		2,706
1915	432,033	65	215	32,911	281,104		314,230	513							1,837	644		2,757
1916	457,500	66	198	40,546	300,767		341,511	867							2,579	750		3,842
1917	502,891	67	214	55,293	335,316		390,823	1,218							2,593	929		4,389
1918	503,515	71	305	63,828	355,928		420,061	1,353						57	2,577	1,602	120	5,574
1919	555,875	68	241	87,073	378,367		465,681	1,331						C60	2,527	2,082	333	6,355
1920	688,884	64	196	157,069	442,929		600,194	1,651						C60	2,628	1,841	425	6,285
1921	766,002	62	188	193,398	472,183		665,769	2,036						C60	2,817	2,083	457	7,068
1922	858,898	65	179	182,278	557,531		739,988	2,866					67	C60	3,699	2,354	1,433	9,649
1923	1,015,736	72	170	149,585	732,407		882,162	3,400					323	C60	5,314	2,445	2,201	13,209
1924	1,014,318	70	161	139,678	713,940		853,779	4,639					425	87	5,699	3,051	4,201	16,863
1925	1,068,933	71	332	115,515	763,743		879,590	6,336					445	C100	8,379	4,057	9,042	26,662
1926	1,096,823	70	364	90,421	770,874		861,659	7,851					1,007	160	9,232	4,387	19,687	40,809
1927	1,262,582	71	477	64,121	901,129		965,727	8,630					6,444	214	10,762	4,971	36,911	67,153
1928	1,324,774	68	624	50,151	901,474		952,249	9,070					15,014	537	10,127	5,380	63,134	102,822
1929	1,485,867	68	1,117	44,688	1,007,323		1,053,128	9,391		B			19,897	1,084	12,006	7,684	105,749	155,490
1930	1,410,037	64	1,522	39,530	898,011		939,063	9,002		56			20,385	1,381	13,422	8,716	137,472	190,767
1931	1,372,532	62	1,543	33,039	851,081		885,663	11,709		25			20,346	1,553	12,449	9,419	136,669	189,494
1932	1,309,677	60	1,044	32,805	785,159		819,008	13,139		44			18,237	1,762	10,089	9,744	116,613	168,179
1933	1,442,146	63	1,145	34,001	905,656	23	940,825	13,691		112			16,414	1,597	9,899	10,126	116,154	167,760
1934	1,522,288	60	1,417	38,172	908,065	28	947,682	14,024		159			13,158	1,620	13,257	9,561	117,720	169,119
1935	1,654,495	60	1,447	40,241	996,596	47	1,038,331	14,297		164			17,341	1,637	16,314	10,894	136,103	196,472
1936	1,791,546	61	1,500	41,028	1,099,687	62	1,142,277	15,458		105			17,598	1,732	17,067	11,671	148,254	210,783
1937	2,039,231	63	2,944	46,907	1,279,160	33	1,329,044	16,355		122			18,756	1,942	17,593	13,237	154,794	221,885
1938	1,988,041	61	6,966	38,506	1,214,355	78	1,259,905	17,076		226			20,599	2,161	17,457	15,503	186,230	258,427
1939	2,086,160	60.6	7,838	42,898	1,264,962	112	1,315,810	18,613		215			21,582	2,246	15,839	17,737	188,174	262,880
1940	2,149,821	62.9	8,591	44,036	1,353,214	142	1,405,983	20,609		288	2		23,857	2,313	13,508	19,270	206,470	284,246
1941	2,220,657	63.1	10,134	42,196	1,402,228	150	1,454,708	21,873		235	3		25,593	2,349	12,126	22,227	185,570	268,764
1942	2,093,100	66.2	10,365	34,815	1,386,645	151	1,431,976	23,704	2	308	33		24,553	1,557	11,935	20,506	228,430	309,092
1943	2,256,637	66.7	10,052	35,163	1,505,613	107	1,550,935	27,714	2	334	48		10,487	2,278	13,629	22,069	147,675	220,185
1944	2,592,371	64.7	10,099	38,203	1,677,904	109	1,726,315	24,230	1	314	58		13,261	2,315	14,654	21,385	177,631	257,344
1945	2,594,798	66.0	8,483	43,547	1,713,655	149	1,765,834	22,881	2	382	79		22,291	2,967	14,389	22,139	257,046	343,435
1946	2,745,474	63.2	7,586	49,235	1,733,939	269	1,791,029	20,604	1	363	67		22,449	2,664	13,744	21,093	323,156	406,450
1947	3,022,075	61.5	7,692	56,284	1,856,987	300	1,921,263	21,846	B	377	97		22,118	2,323	12,468	20,233	388,486	466,663
1948	3,433,021	58.8	12,287	58,508	2,020,185	159	2,091,139	23,734	B	464	144		24,794	2,282	12,764	20,521	434,905	517,586
1949	3,398,455	54.2	22,220	60,910	1,840,307	206	1,923,643	22,961	B	678	109	55	23,792	2,563	14,069	20,111	490,015	574,892
1950*	3,780,973	52.2	29,359	71,967	1,972,809	68	2,074,203	23,108	B	609	276	587	29,722	2,617	14,790	20,617	482,316	573,865
Total	65,536,223	62.4	192,709	2,481,878	40,916,690	2,193	43,593,470	458,297	8	5,580	916	642	33,640	2,564	14,646	20,247	542,401	638,078
													504,595	48,962	401,123	412,712	5,546,364	7,379,199

* **WORLD OIL** from private sources. B Less than 1,000 barrels. C Estimated production.

HERE'S HOW THE *Triplex* CEMENTING SHOE BRINGS YOU "BAKERESULTS"



(A) Baker Triplex Cement Baffle Collar, installed a joint or two above the shoe, serves as a stop for the cementing plug. (B) A hold-down strap (secured by shear screws) retains the Baker Metal Petal Basket close against the shoe or collar while running-in the casing and conditioning the hole. (C) Cementing ports are covered by the Tripping Valve until cementing is commenced. (D) A fabric-reinforced, resilient rubber, sleeve-type, back-pressure valve opens readily (see dotted white line) to permit passage of the cement slurry into the annulus above, but closes instantly to prevent any return flow of the slurry. (E) After reaching the desired point in the hole, circulation is established through the ample central passageway. A Tripping Ball now is pumped (or allowed to gravitate) down the hole to seat upon the Tripping Valve. Pressure of 400 to 500 psi is applied to the casing, which shears the Tripping Valve shear screws and forces the Tripping Valve downward to expose the cementing ports. (F) Shearing the screws also releases the Basket hold-down strap and allows the Metal Petal Basket to expand outwardly against the wall of the hole. The Basket with which each Triplex Shoe is equipped has a wide range of expansion and forms a bridge in large-diameter, or irregular-shaped holes far beyond the range of a rubber packing element. The cementing operation now is carried out in the conventional manner with the cement slurry directed upward with the exclusive Baker "Whirler" action. This "Whirler" principle has proved to be far superior to an undirected jetting action which does not minimize the hazard of channeling, and may wash out cavities and cause cement contamination. Only readily drillable materials are used for all internal parts; and two one-half inch set screws hold the inner assembly stationary to facilitate drilling out.



BAKER OIL TOOLS, INC.

HOUSTON • LOS ANGELES • NEW YORK

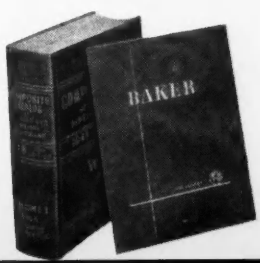
Collar (Product No. 137) which is *not* equipped with a float valve, but acts as an effective stop for the cementing plug;

(b) Baker Triplex Flapper Valve Float Collar (Product No. 134 M&F) which not only serves as an effective stop for the cementing plug, but provides the added safety of an additional float valve. See illustration for details of the bevelled-top, hollow magnesium casting with a hole of sufficient inside diameter to pass the 1¾-inch O.D. Tripping Ball used with all sizes of Triplex Equipment; see also illustration on opposite page.

POPULAR SIZES AVAILABLE

All types of Baker Triplex Cementing Equipment can be secured promptly in API sizes from 4½" to 8⅝". Any Baker serviceman or Baker office will gladly provide additional information and see that your needs receive immediate attention.

For complete details look in your Baker (or Composite) Catalog.



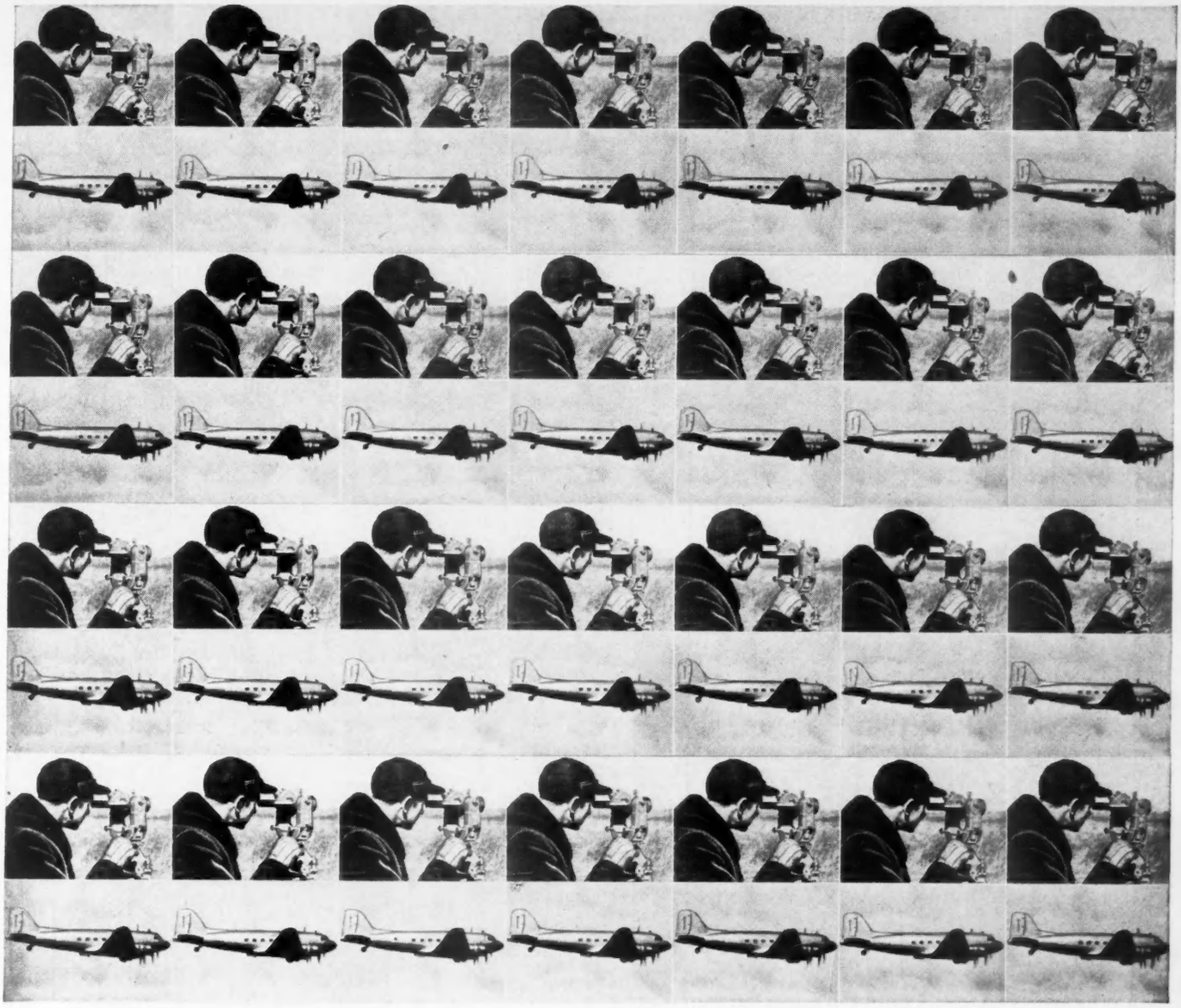
BAKER *Triplex* CEMENTING EQUIPMENT

World Crude Oil Production, By Countries, By Years (Part 2)

Complete production history of world, in thousands of barrels of 42 U. S. Gallons. Sources: *Mineral Resources and Minerals Yearbook*, except as otherwise indicated)

	EUROPE													AFRICA			
Year	Albania	Austria	Czecho-slovakia	Great Britian	France	Ger-many	Hun-gary	Italy	Nether-lands	Poland	Rou-mania	[F]U.S.S.R. (Russia)	Yugo-slavia	[F]Total Europe	Egypt	Algeria	Morocco	Total Africa
1857											2			2				
1858											4			4				
1859											4			4				
1860											9			9				
1861								[B]			17			17				
1862								[B]			23			23				
1863								[B]			28	41		69				
1864								[B]			33	65		98				
1865								2			39	67		108				
1866								1			42	83		125				
1867								1			51	120		172				
1868								[B]			56	88		144				
1869								[B]			59	202		261				
1870								[B]			84	204		288				
1871								[B]			90	165		255				
1872								[B]			91	185		276				
1873								[B]			104	475		579				
1874								1		150	103	583		837				
1875								1		158	108	697		964				
1876								3		164	111	1,321		1,599				
1877								3		170	108	1,801		2,082				
1878								4		176	109	2,401		2,690				
1879								3		215	110	2,761		3,089				
1880						9		2		229	115	3,001		3,356				
1881						29		1		287	122	3,601		4,040				
1882						58		2		330	136	4,538		5,064				
1883						27		2		365	139	6,002		6,535				
1884						46		3		408	211	10,805		11,473				
1885						41		2		465	193	13,925		14,626				
1886						74		2		306	168	18,006		18,556				
1887						74		1		344	182	18,368		18,969				
1888						85		1		467	219	23,049		23,821				
1889						68		1		515	298	24,609		25,491				
1890						108		3		659	383	28,691		29,844				
1891						109		8		631	488	34,573		35,809				
1892						101		18		646	593	35,775		37,133				
1893						100		19		693	535	40,457		41,804				
1894						123		21		949	508	36,375		37,976				
1895						121		26		1,453	576	46,140		48,316				
1896						145		18		2,444	543	47,221		50,371				
1897						166		14		2,226	571	54,399		57,376				
1898						184		15		2,376	776	61,610		64,961				
1899						192		16		2,314	1,426	65,955		69,903				
1900						358		12		2,347	1,629	75,780		80,126				
1901						314		16		3,251	1,678	85,168		90,427				
1902						354		19		4,142	2,060	80,540		87,115				
1903						446		18		5,235	2,763	75,591		84,053				
1904						637		26		5,947	3,599	78,537		88,746				
1905						561		44		5,766	4,421	54,960		65,752				
1906						579		54		5,468	6,378	58,897		71,376				
1907						757		60		8,456	8,118	61,851		79,242				
1908						1,009		51		12,612	8,252	62,187		84,111				
1909						1,019		42		14,933	9,327	65,970		91,291				
1910						1,032		51		12,673	9,724	70,337		93,817				
1911						1,017		75		10,519	11,108	66,184		88,903	21			21
1912						1,031		54		8,535	12,976	68,019		90,615	214			214
1913						857		47		7,818	13,555	62,834		85,111	98			98
1914						781		40		6,436	12,827	67,020		87,104	753	1		754
1915						703		44		5,352	12,030	68,548		86,677	212	4		216
1916						656		51		6,587	8,945	65,817		82,056	404	8		412
1917					[G]	642		41		6,228	3,721	63,072		73,704	943	9		952
1918					363	270		35		6,032	8,730	27,168		42,598	1,935	7		1,942
1919			48	2	334	265		35		6,096	6,618	31,752		45,150	1,517	5		1,522
1920			69	3	356	246		35		5,607	7,435	25,430		39,181	1,042	4		1,046
1921			94	3	389	274		32		5,167	8,368	28,968		43,295	1,255	3		1,258
1922			120	1	496	319		31		5,227	9,843	35,692		51,729	1,188	9		1,197
1923			74	1	494	346		34		5,402	10,867	39,147		56,365	1,054	9		1,063
1924			76	2	497	406		39		5,657	13,369	45,355		65,401	1,122	11		1,133
1925			158	3	459	541		61		5,960	16,650	52,448		76,280	1,226	12		1,238
1926			150	2	478	653		41		5,844	23,314	64,311		94,793	1,188	9		1,197
1927			112	2	504	663		47		5,342	26,368	77,018		110,056	1,267	8		1,275
1928			94	1	512	630		46		5,492	30,773	[D]84,745		122,293	1,842	8		1,850
1929			93		535	704		45		4,988	34,758	[D]99,507		140,630	1,868	20		1,888
1930			157	[B]	523	1,182		59		4,904	41,624	[D]125,555		174,004	1,996	16		2,012
1931			134	[E]	520	1,606		124		4,662	49,127	162,842		219,015	2,038	[E]		2,038
1932			126	[E]	530	1,608		208		4,116	53,815	154,367		214,770	1,895	[E]	7	1,902
1933	11		122	[E]	562	1,665		204		4,072	54,020	154,840		215,496	1,663	[E]	7	1,670
1934	10		178	[E]	557	2,187		151		3,913	62,063	174,318		243,377	1,546	[E]	6	1,552
1935	41	44	133	[E]	541	2,996		119		3,812	61,310	182,386	2	251,384	1,301	[E]	4	1,305
1936	273	50	127	[E]	503	3,115		123		3,789	63,659	186,206	1	257,846	1,278	[E]	4	1,282
1937	619	221	123	[E]	502	3,176	16	110		3,716	52,452	193,241	4	254,180	1,196	[E]	22	1,218
1938	752	383	130	[E]	513	3,861	288	101		3,763	48,487	204,956	9	263,243	1,581	[E]	27	1,608
1939	934	1,240	120		500	4,487	1,103	91		3,898	45,648	216,866	10	274,897	4,666	[E]	27	4,693
1940	1,497	2,808	163	124	496	7,371	1,881	85		3,891	43,168	218,600	10	280,094	6,505	[E]	27	6,532
1941	1,334	4,238	182	223	414	6,303	3,183	95		1,793	40,517	238,150	10	296,443	8,546	[E]	27	8,573
1942	1,601	5,899	271	605	463	5,191	5,037	101		2,794	42,094	227,470	10	291,536	8,275	[E]	41	8,316
1943	1,001	7,478	200	839	356	4,973	6,347	86	1	3,500	39,182	200,750	10	264,723	8,953		39	8,992
1944	334	8,218	185	703	300	6,154	6,277	55	11	3,000	26,191	275,000	307	326,735	9,416		32	9,448
1945	267	3,074	91	532	202	3,935	5,018	53	37	750	34,772	148,953	307	197,991	9,406		26	9,432
1946	1,000	5,734	196	412	368	4,539	5,146	83	395	866	31,434	157,673	245	208,091	9,070		20	9,090
1947	2,000	6,285	210	351	356	4,032	4,330	81	1,340	951	28,552	187,463	365	236,316	8,627		21	8,648
1948	1,500	6,149	204	323	370	4,489	3,647	71	3,122	1,039	34,000	218,000	385	273,299	13,398		100	13,498
1949	2,188	6,100	292	338	411	5,947	3,791	71	3,912	965	33,700	233,000	440	291,155	15,997		136	16,133
1950*	2,106	6,205	280	337	857	7,830	3,460	67	5,193	928	31,609	263,165	489	322,526	16,275		294	16,569
Total	17,468	64,126	4,713	4,807	15,261	106,577	49,524	3,558	14,011	279,381	1,257,195	6,555,013	2,604	8,374,238	152,777	143	867	153,787

* **WORLD OIL** from private sources. [B] Less than 1,000 barrels. [C] Estimated production. [D] Year ended September 30. [E] No more data available. [F] Includes fields in Russian Asia other than Sakhalin. [G] France's earlier production credited to Germany.



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World Crude Oil Production, By Countries, By Years (Part 3)

(Complete production history of world, in thousands of barrels of 42 U. S. Gallons. Sources: *Mineral Resources and Minerals Yearbook*, except as otherwise indicated)

Year	ASIA — Middle East								ASIA — Far East											Total Asia	Australia-N.Z.	Rest of World
	Bahrein	Iran	Iraq	Kuwait	Qatar	Saudi Arabia	Turkey	Total Middle East	British Borneo	[E]Burma-India Pakistan: Burma	Pakistan	India	China	[H] Formosa	Japan	Indonesia	Sakhalin	Total Far East	[F]Total Asia	Australia-N.Z.	Rest of World
1857																					
1858																					
1859																					
1860																					
1861																					
1862																					
1863																					
1864																					
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1874																					
1875																					
1876															5			5	5		
1877															7			7	7		
1878															10			10	10		
1879															18			18	18		
1880															23			23	23		
1881															26			26	26		
1882															17			17	17		
1883															15			15	15		
1884															20			20	20		
1885															28			28	28		
1886															30			30	30		
1887															38			38	38		
1888															29			29	29		
1889															37			37	37		
1890											94				53			147	147		
1891											118				52			170	170		
1892											190				53			243	243		
1893											242				69			311	311		
1894											259				106	600		1,005	1,005		
1895											327				173	688		1,188	1,188		
1896											372				170	1,216		1,758	1,758		
1897											430				237	1,427		2,094	2,094		
1898											546				262	2,552		3,360	3,360		
1899											542				319	2,964		3,825	3,825		
1900											941				539	1,796		3,276	3,276		
1901											1,079				871	2,253		4,203	4,203		
1902											1,431				1,117	4,014		6,562	6,562		20
1903											1,617				996	2,430		5,043	5,043		26
1904											2,510				1,209	5,770		9,489	9,489		36
1905											3,385				1,219	6,508		11,112	11,112		40
1906											4,137				1,347	7,850		13,334	13,334		30
1907											4,016				1,564	8,181		13,761	13,761		30
1908											4,344				1,718	9,983		16,045	16,045		30
1909											5,047				1,871	10,283		17,201	17,201		30
1910											6,677				1,887	11,042		19,606	19,606		20
1911											6,138				1,829	11,031		18,998	18,998		20
1912											6,451				1,737	12,173		20,361	20,361		20
1913		1,857						1,857	141		7,117				1,659	10,846		19,622	19,622		20
1914		2,910						2,910	318		7,930				1,940	11,172		21,183	23,040		20
1915		3,616						3,616	392		7,410				2,636	11,422		21,786	24,696		20
1916		4,477						4,477	629		8,202				2,928	11,920		23,442	27,058		10
1917		7,147						7,147	542		8,491				2,963	12,547		24,630	29,107		25
1918		8,623						8,623	504		8,079				2,861	13,180		24,662	31,809		29
1919		10,139						10,139	596		8,188				2,441	12,778		23,911	32,534		25
1920		12,230						12,230	1,020		8,736				2,238	15,508		27,078	37,217		20
1921		16,673						16,673	1,411		8,375				2,221	17,529		29,145	41,375		20
1922		22,247						22,247	2,849		8,734				2,233	16,958	2	29,338	46,011		20
1923		25,230						25,230	3,940		8,529				2,055	17,066	7	30,506	52,753		22
1924		32,373						32,373	4,163		8,406				1,804	19,870	9	34,029	59,259		24
1925		35,038						35,038	4,257		8,416				1,814	20,473	80	34,946	67,319		24
1926		35,842						35,842	4,942		8,274				1,915	21,422	87	35,955	70,993		23
1927		39,688	338					40,026	4,943		8,011				1,785	21,243	181	36,162	72,004		17
1928		43,461	713					44,174	[I]5,223		8,032				1,789	27,459	440	42,663	82,689		13
1929		42,145	798					42,943	5,290		8,741				1,944	32,118	677	48,703	92,877		15
1930		45,828	913					46,741	4,907		8,747				2,023	39,279	[D]1,134	56,473	99,416		38
1931		44,376	830					45,206	3,854		8,292				1,950	41,729	[D]1,805	58,683	105,424		40
1932		49,471	836					50,307	3,796		8,200				2,050	35,539	2,734	52,377	97,583		54
1933	31	54,392	917					55,340	4,490		8,817				1,630	39,001	2,631	55,875	106,182		62
1934	285	57,851	7,689					65,825	5,140		8,743				1,455	42,606	2,338	59,632	114,972		71
1935	1,265	57,273	27,408					85,946	5,546	7,181	10,503				1,834	46,925	2,881	67,283	133,108		96
1936	4,645	62,718	30,406			20		97,789	5,209	7,588	[E]	2,038			2,249	47,171	2,545	66,730	152,676	5	4
1937	7,762	77,804	31,836			65		117,467	6,009	7,848	[E]	1,978			2,440	50,025	3,212	70,452	168,241	5	4
1938	8,298	78,372	32,643			495		119,808	6,913	7,538	[E]	2,162			2,488	56,724	3,656	78,887	196,354	4	4
1939	7,589	78,151	30,791			3,934		120,465	7,097	7,873	[E]	2,488			2,511	57,318	[C]3,821	80,589	200,397	4	4
1940	7,074	66,317	24,225			5,075		102,691	7,047	7,731	[E]	2,327	4		2,654	62,087	4,000	86,042	206,507	3	4
1941	6,794	50,777	12,650			4,310		74,531	6,864	7,762	[E]	2,302	10		2,639	62,011	4,000	85,740	188,431	3	14
1942	6,241	72,256	19,726			4,530		102,753	3,000	2,500	[E]	2,899	87	62	1,929	53,704	4,000	77,307	151,838	3	
1943	6,572	74,612	24,848			4,868		110,900	4,500	1,000	[E]	2,792	340	48	1,652	24,000	4,000	38,332	141,085	2	
1944	6,714	102,045	30,943			7,794		147,496	6,000	750	[E]	2,735	447	38	1,727	48,294	5,000	63,741	174,641	2	
1945	7,309	130,526	35,112			21,311		194,258	2,100	725	[E]	2,784	505	40	1,601	22,260	5,000	38,940	186,436	2	
1946	8,010	146,819	35,665	5,931		59,944		256,369	2,050	15	[E]	2,363	484	14	1,544	7,600	6,000	20,830	215,088	3	
1947	9,411	154,998	35,834	16,225		89,852		306,320	12,970	59	356	2,193	513	16	1,343	2,100	6,000	14,230	270,599	2	
1948	10,915	190,384	26,115	46,500		142,853		416,767	20,120	360	490	1,863	374	22	1,276	8,020	[C]7,000	31,940	338,260	2	
1949	10,985	204,712	31,000	90,000	750	174,008	95	511,550	25,108	316	746	1,875	533	23	1,122	31,900	[C]7,000	63,423	480,190	3	
1950*	11,008	240,076	47,338	125,122	11,457	200,314	100	635,415	29,700	518	1,515	1,894	730	22	1,353	44,932	[C]7,000	82,101	593,651	8	
Total	120,908	2,383,454	489,574	283,778	12,207	719,373	195	4,009,489	213,580		344,521	3,051	4,830	309	98,397	1,269,060	94,240	2,024,937	6,034,426	59	1,044

* **WORLD OIL** from privare sources. [B] Less than 1,000 barrels. [C] Estimated production. [D] Year ended September 30. [E] Separation of British India and Burma prior to 1935 not available from U.S. Bureau of Mines data used here. Data by Dudley Stamp in "Petrcleum Development and Technology, 1933," and in A.I.M.E. "Transactions" indicate cumulative through 1934 as follows: Burma 184,528, India 20,756. Pakistan included with India prior to 1947. [F] Exclusive of U.S.S.R. fields in Asia, other than Sakhalin, which are included with U.S.S.R. in Europe. [G] Beginning of production in Brunei. [H] Formosa included with Japan prior to 1941. [I] Beginning of production in Brunei.

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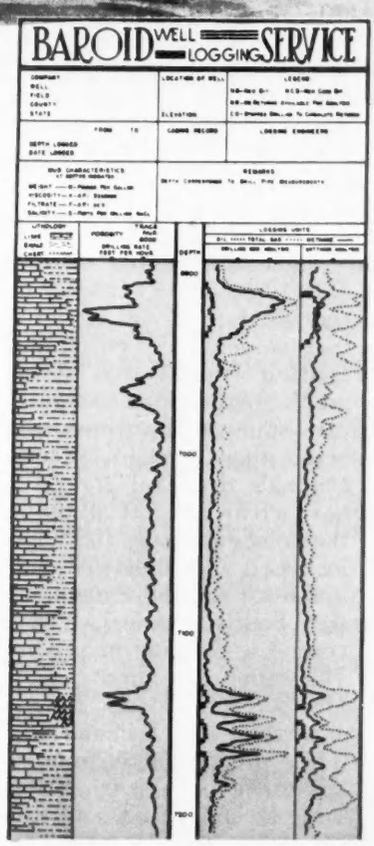

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seriously handicapped in past years because of lack of sufficient funds, trained personnel and equipment. Mexico is gradually overcoming these deficits and the country's progress in oil work has been pronounced in the last three years. As an added incentive to increasing oil reserves, Mexico recently invited foreign companies to explore on a contractual basis. This was done on the basic premise that the more exploratory parties that entered the field the more new fields would be found. This same principle has been proven in all the other major oil producing countries of the world.

South America's output increased 11.1 percent in 1950. Practically all the increase was credited to Venezuela and Colombia and the former country handily maintained its position as the world's second largest oil producer. After a bad year in 1949, with falling markets for its heavy crude and increasing encroachment by Middle East oil, Venezuela bounced back to make 1950 its top productive year. The daily average of 1,486,030 barrels was 12.5 percent above the previous year and 11 percent above 1948, the second top year. The increase in output in 1950 was contrary to the expected trend for the year and indicates that Venezuela cannot be sold short as a producing and exporting oil nation. Exports, which are essential to Venezuelan oil economy, would have dropped last year in all probability if it had not been for the unsettled world political situation. Because of this, other countries in South America increased their imports from Venezuela and some European markets began stockpiling crude from whatever source they could obtain it.

Colombia also showed a substantial gain, going from 29,722,000 barrels in 1949 to 33,640,000 barrels in 1950. In daily figures this represents a 13.2 percent increase, from 81,430 to 92,-164 barrels daily. This was also Colombia's top year in oil production and it may be expected to continue to rise in oil importance. Another factor contributing to the year's new record was the improved political atmosphere in internal affairs, plus more settled labor conditions. Colombia has apparently moved toward increased foreign participation in its search for oil with several decrees passed in November, 1950, which generally liberalize the conditions under which outside capital can enter the country.

Argentina showed a slight gain over 1949 with 23,108,000 barrels as compared to 22,961,000. It appears that Argentina's government controlled industry is slowly losing ground. Argentina's past history indicates that four previous years were better than 1950 in oil output. Argentina's demand for oil products has increased out of all proportion to the domestic supply and imports have increased accordingly.

But for the above mentioned countries South America would have recorded a decrease in production for 1950. Bolivia's production dropped 10.1 percent, Ecuador 2 percent, Peru 1 percent, and Trinidad 1.8 percent. These are not large drops, especially since none of these countries produce large amount of oil, and they do not affect the world picture noticeably. However, the decline is discouraging, particularly in Ecuador where the major foreign operating companies are losing interest in that country's oil potentialities and in Peru where the government has been slow to revise its oil laws to encourage increased foreign participation. In the latter case some favorable changes in the oil laws are expected soon.

Chile, which entered the petroleum production field late in 1949, is gradually coming to the fore as a pro-

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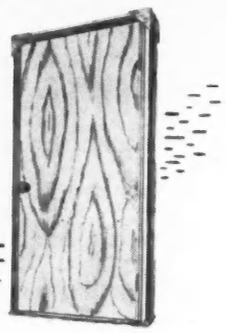

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ducer. While output in 1950 was small, the country may come into its own in this respect when adequate transportation is available to move the crude. Actually, the country is just in the initial stages of oil production and the future volume to be expected from this quarter is still a matter of conjecture.

Despite its small present output, Brazil continues to be one of the most interesting potential oil producers in South America. Competent geologists who have studied the present producing areas and the vast Amazon sedimentary basin feel that Brazil could be one of the major oil producers of the world if exploration was carried on there on as large a scale as in Canada or Venezuela. Brazil is not yet in a position to carry on this work itself and so far has made no move toward permitting outside operators to enter the country.

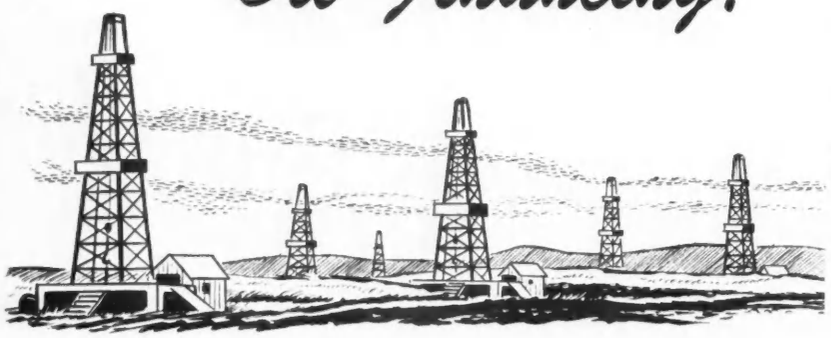
The over-all gain of 14.7 percent in the Far East's crude output during 1950 will probably suffer a severe reversal this year in view of the political situation in that part of the world. Increasing internal strife will probably set back operations in Java, Burma, Borneo, Northern and Southern Sumatra. India and Pakistan, which are under more stable governments, might offset this loss, but the oil industry in these two countries is still in its infancy. Burma, India and Pakistan made tremendous gains in 1950, percentagewise, but Burmese operations are becoming increasingly difficult to maintain. Pakistan and India now are carrying on aggressive exploratory campaigns and foreign operating companies have been invited to come in. The Netherlands Indies showed a respectable gain in oil output during 1950, with Borneo, Southern Sumatra and Brunei turning out most of the production.

Europe registered a 10.8 percent gain in production in 1950 with Western Germany, France and the Netherlands making the only large gain outside of Russia. Western Germany has been doing well with new discoveries and expanded development of its existing fields. It moved from 16,293 to 21,452 barrels daily during 1950, or a 31.7 percent gain over the previous year. France's percentage gain was much greater, but the total volume for the country is still small.

Most of the Russian controlled countries, Czechoslovakia, Hungary, Poland and Roumania, suffered production declines during 1950 as far as can be estimated from the small amount of information available. Much of this decrease is credited to the inefficient operating practices of the Russians in charge of the fields. It is known that the wells are being pulled harder than usual by the Soviets, but this practice is killing more wells than the initial increase in production can offset.

Russia is being credited with an increase in daily production of 12.9 percent, largely on the strength of its own claims, tempered by the range of its estimated trend in past years. While current estimates of Russia's oil production could conceivably be far wide of the mark, the generally accepted figure is presented here to completely round out the data on the world as a whole.

Thinking of Oil Financing?



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All inquiries on petroleum and related matters will receive prompt attention.

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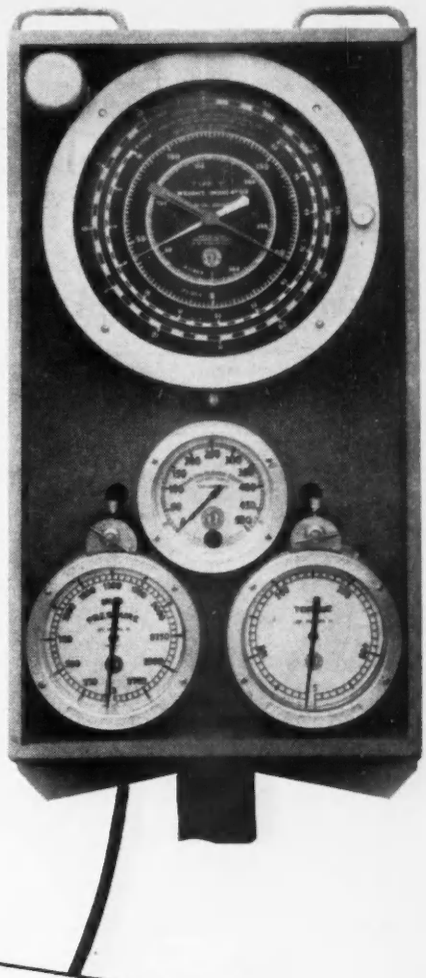

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Half the size . . . Half the weight . . . Two thirds the capacity

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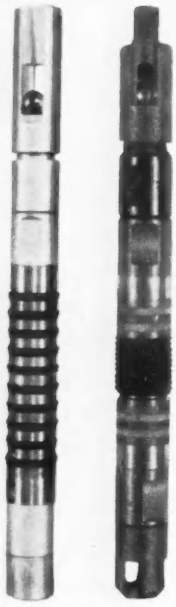
NEW AND IMPROVED EQUIPMENT

SUPPLEMENTING COMPOSITE CATALOG

Subsurface Pump Cups

This item supplements Wilson Supply Company data on pages 5133-5139 of Composite Catalog, 17th Edition.



"No-Friction" subsurface pump cups are made of a special synthetic rubber compound which is highly resistant to all abrasives as well as chemical attack from oil and salt water brines.

Lips of the cups are free to flex with alternating loads and are efficient in their wiping action, which prevents sand from passing. The working barrel tube is wiped clean on each stroke of the pump.

The cups are available in all standard sizes and may be used for both tubing and rod type pumps. Each size cup operates in barrel tubes ranging in size from nominal tube diameters to plus .030 inch oversize.

For additional information write Wilson Supply Company, 1412 Maury Street, Houston.

Induction Motors

This item supplements Fairbanks, Morse & Company data on pages 1601-1616 of Composite Catalog, 17th Edition.

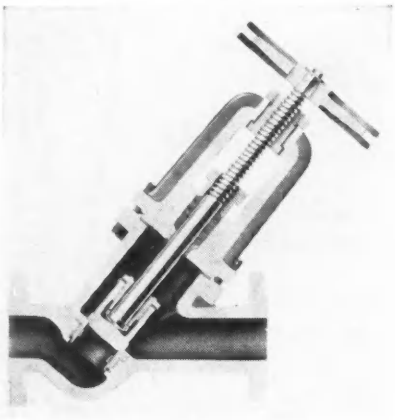
The line of type QZE totally enclosed, non-ventilated, squirrel cage induction motors has been extended to include continuous duty ratings built in NEMA standard frame 284. Now available are 7½ hp, 1800 rpm and 5 hp, 1200 rpm motors. The motors are identical in mounting dimensions with standard totally enclosed, fan-cooled motors of the same ratings. Rotors are Fairbanks-Morse "Copperspun." Ball bearings are of the cartridge type with grease space to permit sealing for the life of the bearing if desired.

For additional information, write for Bulletin 1215, Fairbanks, Morse & Company, 600 South Michigan Avenue, Chicago 5.

Boiler Blow-Off Valve

This item supplements Everlasting Valve Company data on pages 1576-1577 of Composite Catalog, 17th Edition.

Head, or disc, of a new straightway Y-type valve is made of "H" monel metal and the seat of monel metal. This combination of metals is especially resistant to the erosive and corrosive conditions to which a slow opening blow-off valve is subjected. The seat has upper and lower sealing gaskets to protect the seat threads from corrosion. Stem is made of stainless steel and



the stem nut of bronze. Construction is identical to the angle blow-off valve, and all working parts for the straightway Y and angle valve are interchangeable. The valves are available in 1½-, 2- and 2½-inch sizes, in cast iron or cast steel, for pressures up to and including 600 pounds.

For additional information write Everlasting Valve Company, Department 39, 49 Fisk Street, Jersey City, N. J.

Save Time—Write Direct

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Christmas Tree Gauge

This item supplements Jas. P. Marsh Corporation data on pages 3084-3085 of Composite Catalog, 17th Edition.

A new pressure gauge for christmas trees has an innovation in the method of joining the bourdon tube to the socket of the gauge and joining the end-piece to the bourdon tube. The bourdon tube is Conowelded into the socket and to the end-piece to form the equivalent of one-piece construction and is leak-proof. The case is of heavy gauge wrought steel and copper-clad. The movement used in the gauge is the Marsh "Mastergauge," of stainless steel and monel construction. It is available in all required pressure ranges.

For additional information, write Marsh Instrument Company, sales affiliate of Jas. P. Marsh Corporation, Skokie, Ill.

Switchboard Instruments

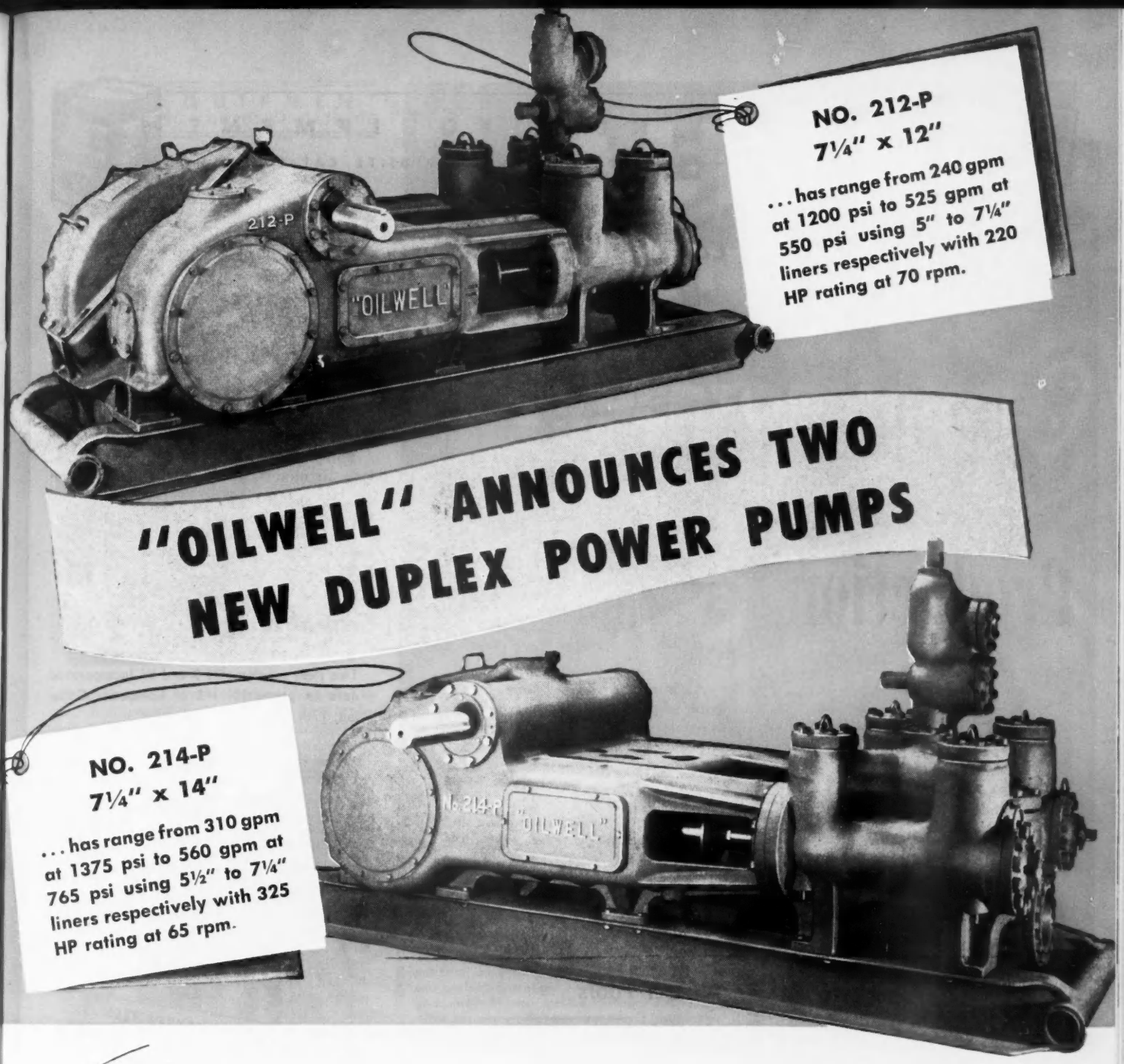
This item supplements General Electric Company data on pages 1809-1820 of Composite Catalog, 17th Edition.

Cover design of a new line of 4¼-inch long-scale switchboard instruments permits shadow-free illumination of instrument scales with conventional room lighting.

Designated Types AB-18 (a-c) and DB-18 (d-c), the instruments have a protruding convex glass cover that permits the scale to be mounted flush with the front of the instrument case, while providing clearance for moving parts. Scale shadows from overhead lighting caused by cover overhang are thus eliminated.

Shock resistant bearings protect jewels and pivots under normal conditions. Jewels are spring-mounted to protect pivot points from shock. Magnetic damping assures quick response and permanency of characteristics.

For additional information write General Electric Company, Apparatus Department, Schenectady 5, N. Y.


212-P
"OILWELL"
NO. 212-P
7¼" x 12"
... has range from 240 gpm at 1200 psi to 525 gpm at 550 psi using 5" to 7¼" liners respectively with 220 HP rating at 70 rpm.
"OILWELL" ANNOUNCES TWO NEW DUPLEX POWER PUMPS
NO. 214-P
7¼" x 14"
... has range from 310 gpm at 1375 psi to 560 gpm at 765 psi using 5½" to 7¼" liners respectively with 325 HP rating at 65 rpm.
"OILWELL"

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One-piece, high-strength power frame.

One-piece, direct-flow type, cast steel fluid end with large passages for easy flow.

Heavy-duty, field-adjustable roller bearings throughout.

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Forged alloy-steel, heat-treated, fluid valves and seats.

Power end lubricated with combination oilbath and positive-flow lubrication.

Crosshead-pin roller bearings, diaphragm stuffing boxes, and fluid-end stuffing boxes are pressure grease-lubricated.

THESE two slush pumps are designed to fill in the "Oilwell" line of "200 series" pumps for medium-depth drilling. They give you "big pump" strength and rigidity in smaller sizes and are built with the same heavy-duty construction features that have made "Oilwell" No. 220-P and 218-P Pumps so outstanding in the deeper drilling ranges.

Check their outstanding features and compare them point by point with other pumps in their class. Your friendly "Oilwell" representative will gladly give you all the facts . . . or write for "Oilwell's" New Duplex Pump Booklet, No. 9-51.

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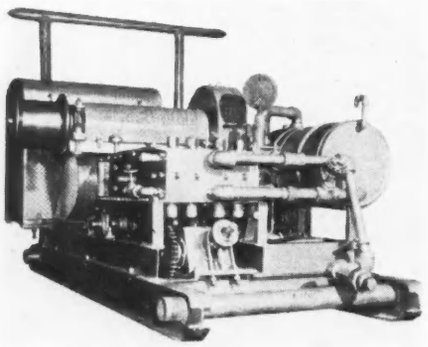
NEW EQUIPMENT

SUPPLEMENTING COMPOSITE CATALOG

Casing Pulling Machine

This item supplements Riley Machine Works data on page 4307 of Composite Catalog, 17th Edition.



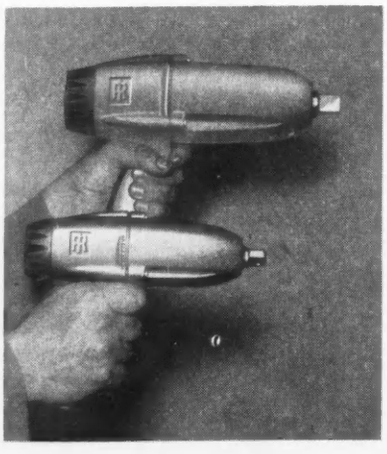
An improved casing pulling machine, capable of pulling a joint of pipe per minute, is equipped with a four-cylinder pump with a 2½-inch shaft operating up to 600 revolutions per minute and 6500 pounds pressure. The crankshaft operates on Timken roller bearings, in complete oil bath, and is removable without dismantling the pump. The machine has a three-ball, full-opening release valve to facilitate operation of jacks. It can be mounted on trucks or skids and is available with or without mast pole.

For additional information, write Riley Machine Works, Burkburnett, Texas.

Impact Tools

This item supplements Ingersoll-Rand Company data on pages 2465-2472 of Composite Catalog, 17th Edition.

In designing two new air-operated Impactools, Size 504 for nut running up to ⅜ inch, and Size 510 for nut running up to ¾ inch, emphasis has been placed on scientific muffling to lower operator fatigue and increase morale and safety.



Size 510, weighing 11¼ pounds and measuring 10⅞ inches long, is the most powerful Impactool built for one-hand operation. Size 504 may be used for multi-purpose operation in drilling, step drilling, reaming, tapping, driving screws, sawing holes in sheet metal, removing broken studs and cap screws, drilling in masonry. It weighs 5¾ pounds and is 8 9/16 inches long.

Both tools have small but powerful vane type air motors, automatic lubrication, and air strainers to keep out rust, scale, and dirt.

For additional information write Ingersoll-Rand Company, 11 Broadway, New York 4.

Centralizer

This item supplements B and W Incorporated data on pages 481-486 of Composite Catalog, 17th Edition.

The new "Kon-Kave Bow" of the B and W Latch-On Centralizer increases the strength or resistance to side-thrust of this equipment, the manufacturer claims. The spring employs the principle of the arch in its curved cross-section, and aids in providing positive centering of the casing.

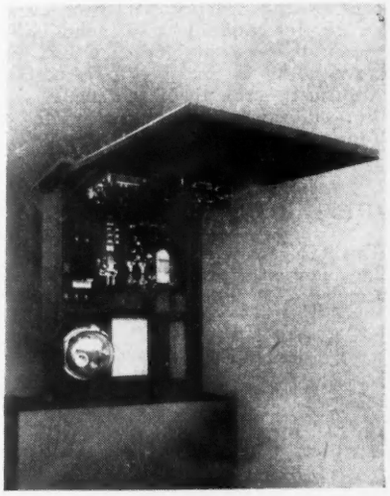
The spring is drop-forged from alloy spring steel, and treated to relieve all internal stresses created in forming the bows and welding them to the hinged collars.

For additional information write B and W Incorporated, P. O. Box 5256, Houston 12; or 3545 Cedar Avenue, Long Beach 7, Calif.

NEW EQUIPMENT
SUPPLEMENTING COMPOSITE CATALOG

Engine Starter

This item supplements Westinghouse Electric Corporation data on pages 4965-4984 of Composite Catalog, 17th Edition.



Improved oil well pumping control is possible through use of the new Combination Life-Line starter, Class 11-206-OP. Designed for application with a single-speed squirrel-cage motor used in oil well pumping, it starts, stops and provides the motor with overload, low voltage, short-circuit and lightning protection.

In NEMA sizes 1 through 4 as either a local control unit or automatic unit (time switch automatically controls motor for predetermined pumping periods during day), the Combination Life-Line starter is made in ratings up to 100 hp, 440-v polyphase.

New components include a Life-Line starter; a 3-pole, 650-v lightning arrester; and a slamproof self-indicating handle. The enclosure permits inclusion of optional accessories such as the day-omission feature that allows programming of a week's pumping, and the time-delay relay (for staggered automatic restarting after power failure).

A top-hinged door telescopes into the sheet-metal cabinet to provide weather-proofing without gaskets, and a mechanically-interlocked dead-front inner door protects the operator.

For further information, write the Westinghouse Electric Corporation, P. O. Box 2099, Pittsburgh 30.

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As a service to readers, all items in WORLD OIL include the complete mail address of the manufacturer. This makes it possible for those desiring additional information to write any manufacturer without the delay occasioned by going through offices of WORLD OIL, and enables subscribers to request specific data in which they are particularly interested.

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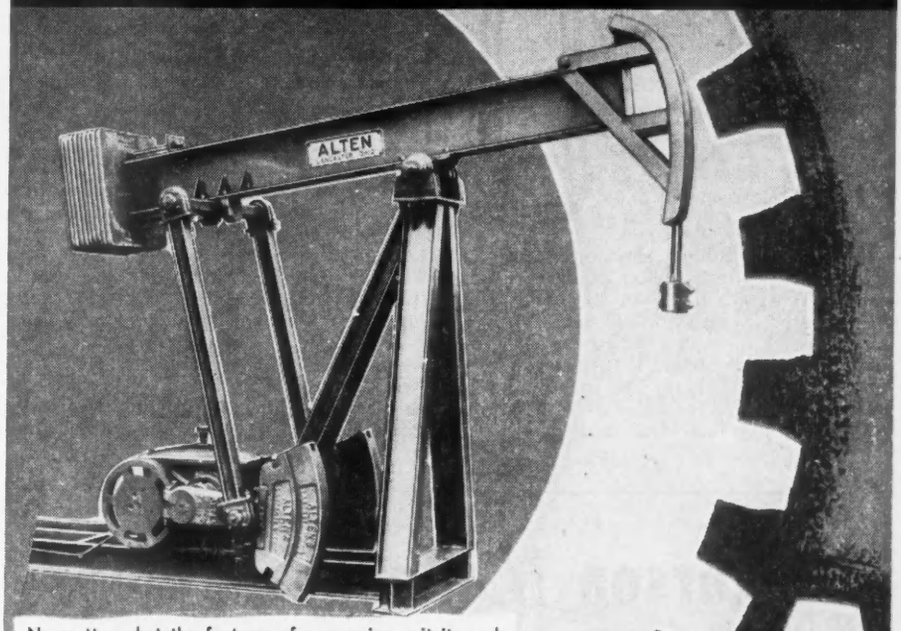
PUMPING UNITS ARE *Geared* FOR BEST PERFORMANCE



No matter what the features of a pumping unit its real worth depends on the gears. Alten gears are precision cut from alloy steel and shaved for exact tooth profile and perfect operation. Altenizing, our exclusive process, gives teeth highest surface hardness and longer life. Alten has every other feature, too. It gives longer strokes and higher gear reducer ratings. If you want a unit that will positively perform to its full rated capacity — one that's easy to maintain and economical to operate — buy an Alten.

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AT YOUR LOCAL SUPPLY STORE

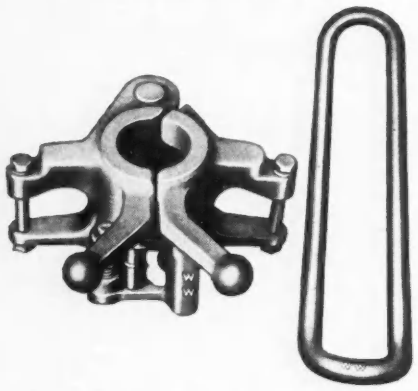
ALTENS FOUNDRY & MACHINE WORKS, INC.
LANCASTER, OHIO

NEW EQUIPMENT

SUPPLEMENTING COMPOSITE CATALOG

Tubing Elevator and Links

This item supplements Web Wilson Oil Tools data on pages 5057-5080 of Composite Catalog, 17th Edition.



Type CTL tubing elevator meets all requirements for handling plain or upset tubing. It weighs less than 30 pounds and has a rated capacity of 25 tons, with a safety factor of 4 to 1 based on the ultimate strength of the steel. It fits all diameter links from 1¼ to 1¾ inches and is especially adapted for use with Web Wilson tubing elevator links described below.

The hinge spring provides self-opening of the elevator when it is unlatched, and forces the elevator off and away from the tubing. It also holds the elevator open. The Type CTL tubing elevator has a sturdy stirrup-type latch. The top bearing surface is flame-hardened for long service.

"Magnaweld" tubing links are lightweight, but amply strong for service where strings of tubing and similar loads are to be handled. They are made of selected steel, electrically welded and formed, then "Magnafluxed" to insure freedom from metallurgical and mechanical defects.

The links are made in two sizes: 1¼ x 30 inches, with a rated capacity of 25 tons for each link; and 1½ x 36 inches, with a 30-ton rated capacity for each link. Both have a safety factor of 4 to 1, based on the ultimate strength of the steel.

For additional information, write Web Wilson Oil Tools, Inc., P. O. Box 96, Los Angeles 2.

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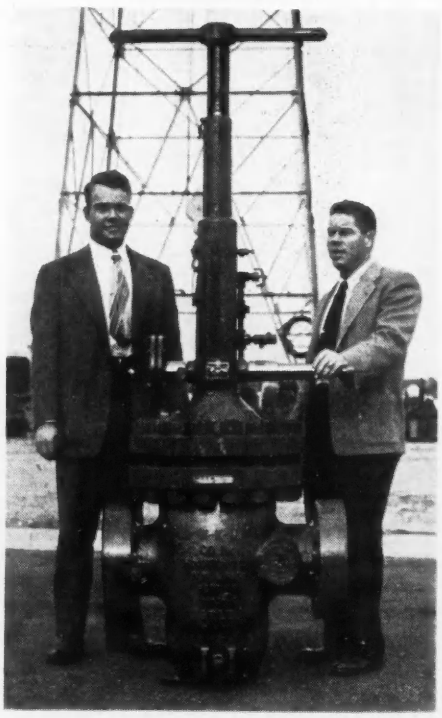
Safety Valve

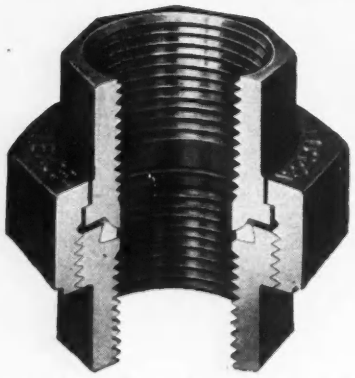
This item supplements Otis Pressure Control, Inc., data on pages 3885-3920 of Composite Catalog, 17th Edition.



Herbert Otis, Jr., left, vice president of Otis Pressure Control, Inc., and Curtis Kizer, an Otis engineer, stand beside a six-inch, 10,000 psi "Type XDK" Otis surface safety valve for The Taylor Mayfair Properties. The valve is to be installed on a 12-inch gathering trunk at a point immediately before the gas enters the plant. Unsafe pressure variations beyond predetermined settings will automatically actuate the high-pressure pilot (where Kizer's hand is) which will cause the gate valve to close. The resulting rise in pressure in the trunk line will actuate similar Otis safety valves installed at the several wellheads in the system, causing them to close automatically also. The valve on the trunk line also may be closed from a remote point by a low-pressure air supply tied in to a diaphragm pilot. Otis has engineered other automatic safety valves of this type for large-diameter high-pressure injection lines, and for river crossings of gas transmission lines. Valves for high-pressure lines as large as 10 and 12 inches have been shipped abroad.

For additional information, write Otis Pressure Control, Inc., Box 7206, Dallas.

Jefferson Malleable Unions



JEFFERSON'S *EXCEL* unions and union fittings available in brass-to-iron, and iron-to-iron seats. Certified Air Furnace iron used in the EXCEL line is A.S.T.M.-4733-Grade 35018 malleable, having a 53000 lb. Min. Ten.

EXCEL—
250 lb. S.W.P.—500 lb. C.W.P.

Certified Air Furnace iron produces a constant, uniform, finer grain structure union. This provides a much better iron with which to produce a positive dependable seating surface.

Unions manufactured from this malleable iron give 30% more strength; 50% more impact value; 75% more elongation. Sizes ¼" thru 3".

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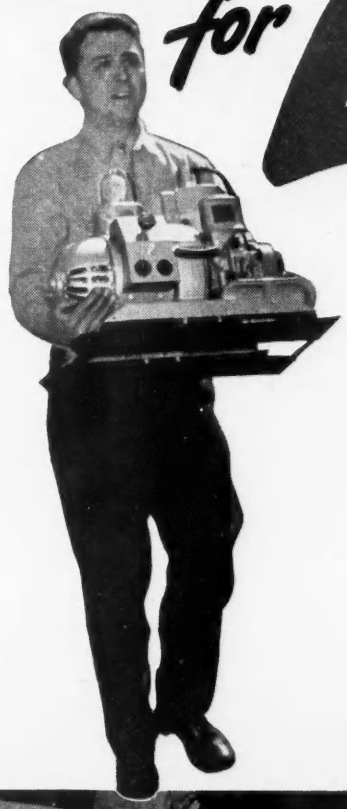
Go High Cycle for Low Costs

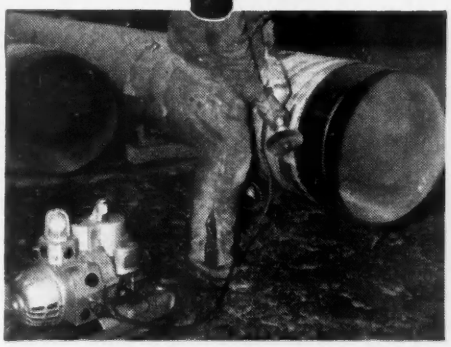


High Cycle Tools Operated by a HOMELITE *Dual Purpose* GENERATOR will greatly reduce your costs

High cycle tools are not only here to stay . . . they're here to *save.* Lighter in weight . . . easier to handle . . . more efficient in operation . . . these modern tools are saving money by cutting down man hours. Yes, and they're saving money on tool repairs because high cycle tools are far easier to keep in good condition.

And the beauty of it all is this: — These savings are yours any place on your road if you have a Homelite Dual Purpose Generator. Light enough for one man to carry, this gasoline-engine-driven generator can be easily put into action *anywhere.* It provides plenty of power for operating high cycle tools. Moreover, this same generator can also be used to operate floodlights or your present standard universal tools.

Look into this Homelite Dual Purpose Generator. It's a big step in the right direction towards lower costs through high cycle operations.



For operating high cycle grinders

For operating high cycle wrenches

For operating Homelite Electric Chain Saws

STICK TO THE RULE OF THREE AND YOU'LL ALWAYS STICK TO A HOMELITE

1. Performance. A Homelite gives you plenty of power where you want it, when you want it . . . power with a large overload capacity . . . power that isn't sapped by long dangerous cables. It is not affected by extreme temperatures and is dust proof, rainproof, *foolproof.*

2. Dependability. The famous Homelite dependability is the result of building more than 275,000 gasoline-engine-driven units during the past quarter century. Finest, tested materials, precision workmanship, plus sound simplicity in advanced design are part of every Homelite.

3. Service. Close field supervision of every Homelite unit is a part of Homelite service. If you ever need repairs, there's a trained Homelite representative near you . . . ready for your call . . . ready to give you instant repair service in the field or in his completely stocked shop.

Carryable

Blowers · Chain Saws

Pumps · Generators ·

PERFORMANCE · DEPENDABILITY · SERVICE

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NEW EQUIPMENT

SUPPLEMENTING COMPOSITE CATALOG

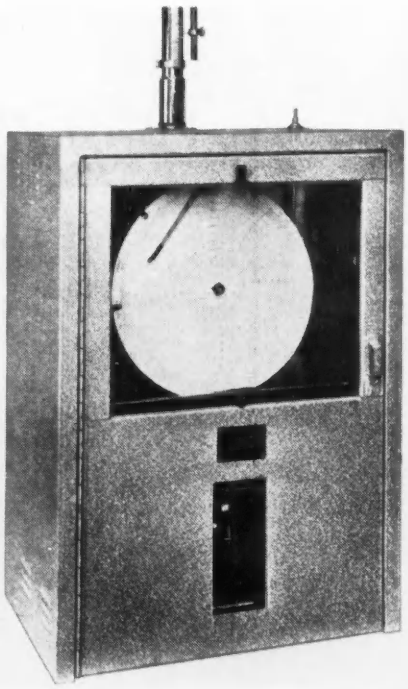
Gas Gravitometer

This item supplements American Recording Chart Company data on pages 338-339 of Composite Catalog, 17th Edition.

All parts of the ARCCO Gas Gravitometer which come in contact with the sample are made of stainless steel. This new development applies to both the standard instrument and the "Dry Air" type. In cases where corrosive gases are not encountered, the Standard line of ARCCO-ANUBIS gas gravitometers is available.

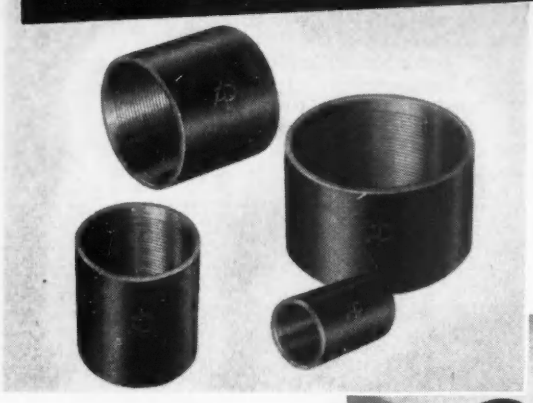
These instruments, for both corrosive and non-corrosive gases, are made in two standard ranges, one a .5 specific gravity using 150 cm. column in which case the range may cover .5 to 1.0; .7 to 1.2; and 1.0 to 1.5. The other is a 1.0 specific gravity range using a 75 cm. column. In this case, the range would cover from 0 to 1.0; .5 to 1.5 or 1.0 to 2.0, etc.

Where periodic changes of the specific gravity ranges are desirable, weights can be furnished which will raise or lower the gravity range of the instrument.



For additional information, write American Recording Chart Company, 3113 East 11th Street, Los Angeles 23.

The Always-Dependable Source for Couplings and Flanges is HARRISBURG STEEL CORPORATION



HARRISBURG Seamless Steel Pipe Couplings are made to A.P.I. and A.I.S.I. specifications.

HARRISBURG Drop-Forged Steel Pipe Flanges are manufactured to A.S.A. standards.

Consult our Oil Country Distributors or write Harrisburg for information

SEE OUR CATALOG IN THE COMPOSITE CATALOG

HOUSTON: Henry H. Paris, Distributor, Inc.
LOS ANGELES: Howard Supply Company
Republic Supply Co. of California
TULSA: W. C. Norris, Manufacturer, Inc.

HARRISBURG STEEL CORPORATION
Harrisburg 8, Pennsylvania

Custom-Built Quality Products in Quantity
98 YEARS IN PENNSYLVANIA'S CAPITAL

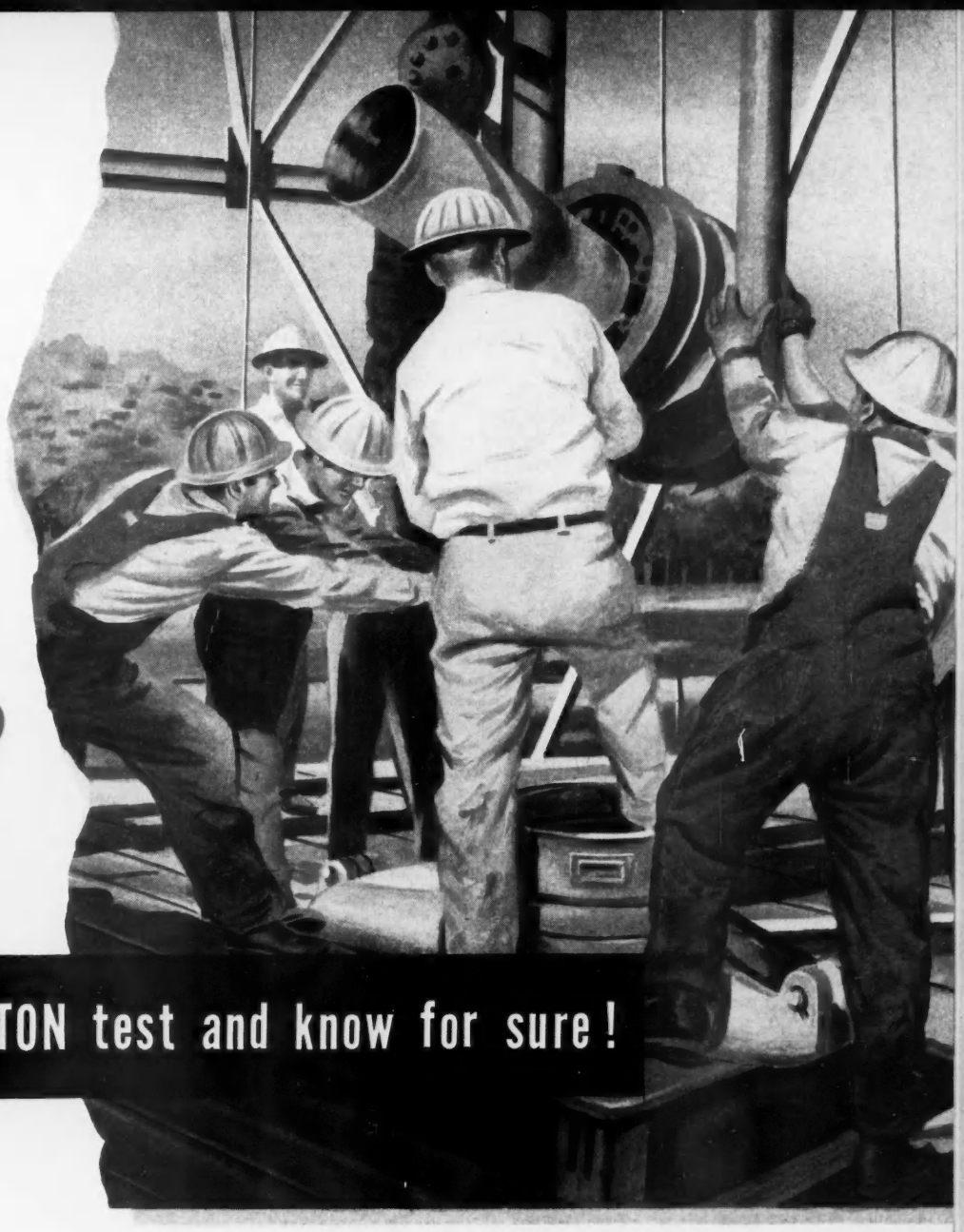
Block

This item supplements International Derrick & Equipment Company data on pages 2477-2536 of Composite Catalog, 17th Edition.

A 200-ton capacity block has been added to the regular line of Ideco Shorty blocks.

These blocks have found wide acceptance among operators using drilling and servicing masts. They are unitized assemblies which combine the block, spring loaded link adapter and swivel bail hook into a short compact assembly. Added head room provided by this design permits fast operation as the pipe may be hoisted safely at full speed to the top of the run. The 200-ton capacity Shorty block has 36-inch Fabriform sheaves manufactured by Ideco's Beaumont plant. Dynamically balanced for smooth operation, Fabriform Sheaves give increased wire line and sheave life. The 200-ton Shorty block has a hydraulic cushion return that eliminates snap and jar of the hook. Ideco Shorty blocks are available in 200-ton, 125-ton, 65-ton capacities.

For additional information, write International Derrick & Equipment Company, P. O. Box 1331, Dallas 1.



Oil? Gas? Water?

We made a JOHNSTON test and know for sure!

AFTER GETTING CASING from anywhere and everywhere you can't *afford* to run it in a hole that might turn out dry. The *scarcity* and *cost* of casing has meant an even more important place for the Johnston Open Hole Tester in deciding whether or not to set casing. The unfailing dependability of this Tester has been proved in hundreds of holes over many years.

When it is *time to test*—and you want to know productive possibilities for *sure*—call Johnston. Service men are available twenty-four hours a day in all active areas.

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M. O. JOHNSTON OIL FIELD SERVICE CORP.

Servicing California, Rocky Mountains & Canada

FORMATION AND CASING TESTING — JOHNSTON

OTHER NEW AND IMPROVED EQUIPMENT

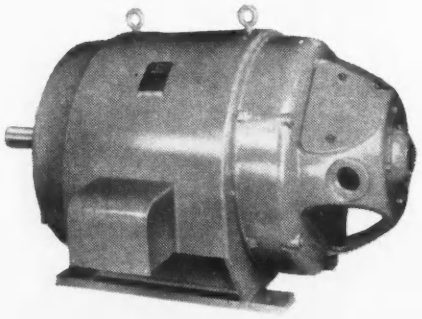
Fluorescence Detector

Ultraviolet fluorescence can be detected anywhere, any time, regardless of surrounding light conditions, with a new instrument, the Menlo Fluoretor. The complete unit weighs less than two pounds and operates from a pair of standard size flashlight batteries. The instrument contains a source of ultraviolet light, available at either 2537 or 3660 Angstroms; a magnifying, focussing eyepiece that also forms a protective filter to protect the eye; and a dark-chamber with six varied specimen holders. These holders slip into the light-tight dark-chamber and provide for the examination of substances in practically any form. The specimen holder can be replaced by a sponge rubber cone that permits the examination of portions of large surfaces in daylight.

For additional information, write Menlo Research Laboratroy, Menlo Park, Calif., or Parlam Corporation (sales agent), 340 Canal Street, New York 13.

Wound-Rotor Motor

Variable speed drive, high starting torque and low starting current are provided in a new line of heavy-duty, wound-rotor induction motors. Pictured is the 200 horsepower, 1750 rpm E-M model. Built in ratings from 30 to 1500 horsepower, drip-proof construction is standard. Splash-proof or enclosed, forced-ventilation models are also available. Frame is heavy-duty fabricated steel. Motors are available with either ball or split-sleeve type bearings. Brush pressure is adjusted with a ratchet wheel brush tension adjuster which provides metered increase or decrease of pressure on the individual brushes.



For additional information write Electric Machinery Manufacturing Company, 1335 Tyler Street N.E., Minneapolis 13.

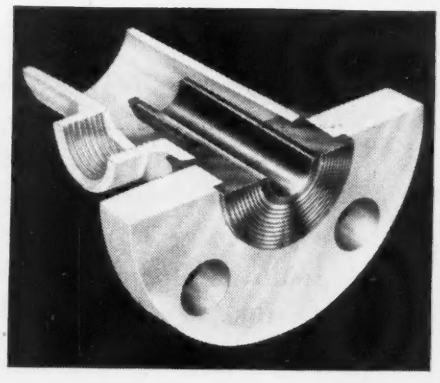
Trucks

New Ford trucks for 1951 have automatic Power Pilot carburetion-ignition control on all engines, a system which meters and fires the correct amount of fuel at the right instant under varying loads without spark knock. Cab and front have been restyled, and the rear window has been enlarged. Instrument panel has full-vision instruments, rheostat type instrument light switch and a hand throttle on all conventional models. Structural and engineering changes have been incorporated in all models.

For additional information, write Ford Motor Co., Rotunda, Dearborn, Mich.

Heat Exchanger

Economy of corrosion-resistant materials is practiced in the construction of a new heat exchanger, which has the materials only where required: as flange inserts and for the inner tube which contacts the fluid or vapor being heated. A corrosion resistant joint is made without welding to the inner tube, by expanding the alloy inner tube into prepared serrations in the inside of the insert flange by special torque limit tools which prevent undesirable stresses. Uniform heat is provided over the full surface from flange to flange without dead spots. It can be supported vertically or horizontally along a wall, or on hangers. The heat exchanger, known as Econalloy, is available in sizes from a fraction of a square foot of heating surface to several hundred square feet, in lengths up to 30 feet per segment. Internal tube sizes range from ¼ inch to 4 inches. Standard units are available for pressures up to 900 pounds per square inch, and temperatures in excess of 700° F.



For additional information, write for Bulletin 9-1, Martin-Quaid Company, 1804 Sedgley Avenue, Philadelphia 32.

Gotkool
WATER CANS
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GOTT
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GOTKOOL WATER COOLER
Made in 2, 3, 5, 8, 10, 15 and 20 gallon sizes with Push-Button Faucet.
GOTT Water Coolers are the convenient way to keep drinking water handy to the worker, protect it from impurities. Their exclusive construction keeps water cool for long periods. Snug fitting large removable top, handy non-leaking push button faucet. GOTT Water Cans for handy field use. Your Supply Store has them, get one today! . . . .
GOTKOOL WATER CAN
Made in 1½, 2, 3, 5, 10, 15 and 20 gallon sizes. (Push-Button Faucet at slight additional cost.
H. P. GOTT MFG. CO.
WINFIELD, KANSAS
KEEP PURE DRINKING WATER ALWAYS HANDY

PHOTOGRAPHIC MAPS
Mosaics, contact prints, strip maps for pipe line location. An accurate picture of the ground itself.
REGIONAL BASE MAPS
Tied to geodetic control, showing the permanent land-line net in accurate position and orientation, regardless of distance and political boundaries.
OWNERSHIP MAPS
Photographically controlled and reflecting the true state of land occupancy.
Inquiries invited on any mapping problem — without obligation.
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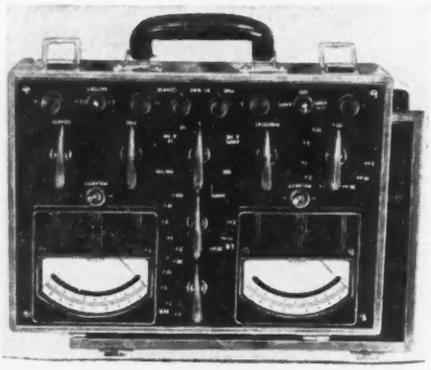
THE MAPPING AGENCY FOR THE OIL INDUSTRY

Testing Meter



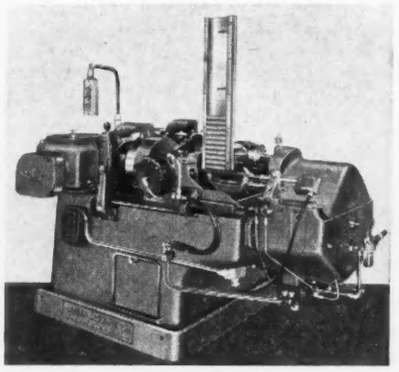
A new model, the B-3, of the Multi-Combination Meter for electrolysis, corrosion and cathodic-protection testing, has a low range of 2 millivolts and special mirror scales 3.9 inches long. Accuracy is 1 percent.

By use of a circuit selector switch, the two high-sensitivity d-c instruments can be connected into a variety of measuring circuits for measurement of potentials, current, resistance and soil resistivity. Internal batteries with switch and coarse and fine controls can be used to supply and control current for test purposes. Voltmeters, or voltmeter and ammeter can be used separately or simultaneously. Polarity reversing switches are provided for both current and potential measurements.

For additional information write M. C. Miller, 1142 Emerson Avenue, West Englewood, N. J.

Threading Machines

The Landmaco No. 2 automatic nipple threading machine and the No. 2 automatic close nipple threading machine thread, ream and chamfer nipples in a continuous automatic operation, thus eliminating secondary manual handling. Through a mechanism which transfers and



turns the nipple end-for-end, these operations are performed on both ends and in a continual cycle.

The machine produces commercial standard long nipples up to 6-inch lengths, and is built in two size range capacities, ½ to ¾-inches and 1 to 2 inches. The close nipple attachment produces standard close, short, and special short nipples.

For additional information, write Landis Machine Company, Waynesboro, Penn.

Steam Cleaner

Rated capacity of 260 gallons of solution vaporized per hour of the Kelite HD Model S steam cleaner is the result of a "water wall," composed of 42 feet of tightly coiled ¾-inch pipe at the point of greatest heat radiation. Altogether, 330 feet of pipe is used in the water jacket. Stack temperature is reduced to about 400° F., the manufacturer claims.

For additional information write Kelite Products, Inc., Box 2917—Terminal Annex, Los Angeles 54.

★ Hot Applied Tar Base Coatings
★ Cold Applied Tar Base Coatings—Series 100
★ Alkyd Base Coatings—Series 200
★ Chlorinated Rubber Base Coatings—Series 300
★ Vinyl Base Coatings—Series 400
★ Phenolic Base Coatings—Series 500

Protective Coatings Booklet
Now Available

Booklet containing specific information on Pitt Chem Protective Coatings will be sent upon request.

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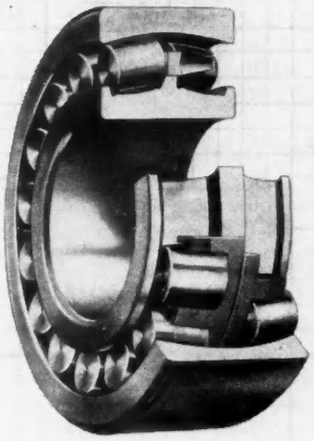
Attend the N.A.C.E. Convention in New York City, March 13th to 16th



when the drilling is tough

TORRINGTON SPHERICAL ROLLER BEARINGS

Wilson Manufacturing Company backs up drill bits with smoother power, easier control and rugged construction in its Giant Remote Control Rigs.

Torrington Spherical Roller Bearings are used in many applications in Wilson rigs. Despite heavy loads Spherical Roller Bearings deliver power efficiently without developing binding stresses under shaft deflection. Accuracy of contact between rollers and races provides high capacity, insures stamina and low maintenance on exacting drilling schedules.

Automatic self-alignment, high load capacity and precision operation are features of Spherical Roller Bearings that can help you improve performance of your equipment. Call in a Torrington engineer to help you work out details of design and application.

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South Bend 21, Ind. • Torrington, Conn.

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TORRINGTON SPHERICAL ROLLER BEARINGS

SPHERICAL ROLLER
TAPERED ROLLER
STRAIGHT ROLLER
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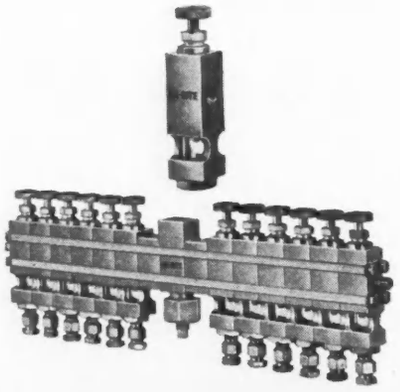
BALL
NEEDLE ROLLERS

Angle Sight Feed Valves

A new line of angle sight feed valves, styles SFG and SFM, for pressure or gravity oiling systems permits construction of a complete oiling system, supplementing the straight sight feed valves, style SFN. The valves have free-flow characteristics and allow the flow of oil to be visually checked and closely regulated. Two new styles, single (SFG) and multiple (SFM), are available. SFG has needle valve control and regulates oil flow from full flow to a complete shut-off. Gang mounted sight feed valves permit multiple oiling controlled from a central point. Standard Style SFM Model B-211 is illustrated.

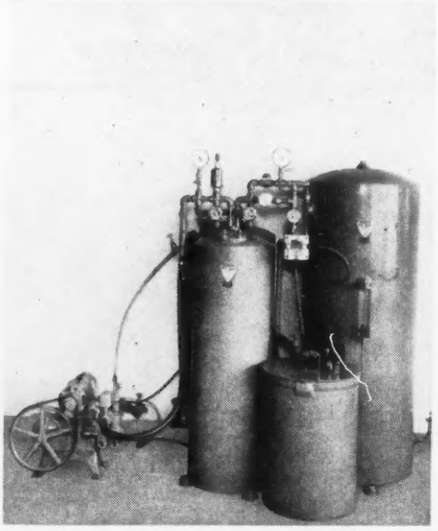


For additional information, write Oil-Rite Corporation, Milwaukee 15.

Water System

Pure water can be supplied to drilling rigs and other remote locations by "Tri-Sure," a packaged water purification and storage system.

The system consists of "Sureclor," a water-energized chlorinator, and pumping, filtering and pressure-storage equipment. Operated by the main supply line pressure, Sureclor purifiers function automatically. The entire system is portable.

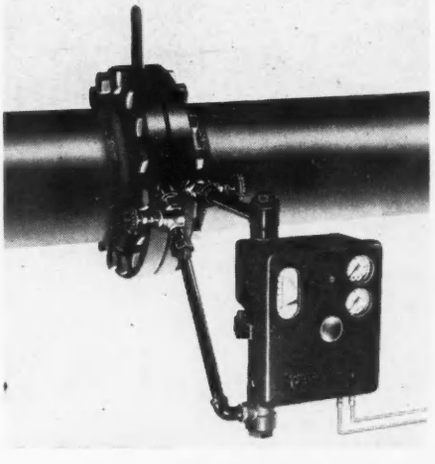


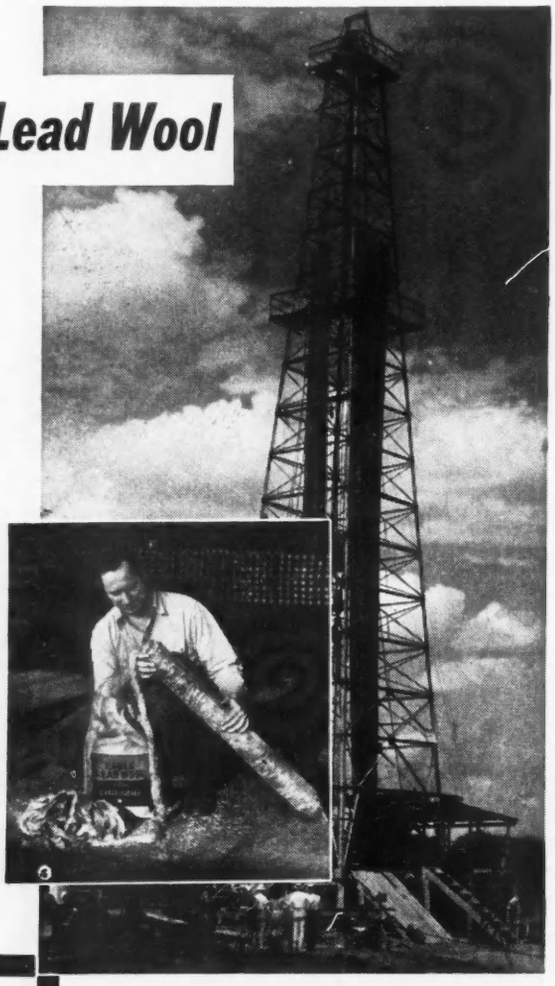
For additional information write Paddock Engineering Company of Texas, 3727 Atwell, Dallas.

Flow Transmitter

The V/A Cell, a flow transmitter for differential pressure applications, is basically a through-flow instrument of the variable-area type and measures a bypassed portion of the main-line flow. Continuous self-purging is thus provided. It is mercuryless but does not utilize a diaphragm of any kind, and mainfold systems, bellows, seals, exterior purges and condensate chambers are eliminated.

For additional information, write Fischer & Porter Company, 42 County Line Road, Hatboro, Penn.





Eagle-Picher Lead Wool

STOPS

bottom water

Rule out the risk of oil-wasting bottom water shutdown by tamping Eagle-Picher Lead Wool in the hole. The finely stranded, flexible metallic wool makes a water-tight plug that seals every crack and crevice. Comes in convenient 50-pound sacks—easy to place in special cartridge-shaped Eagle-Picher Wire Containers sized to fit all casings. Order through your jobber.

THE EAGLE-PICHER SALES COMPANY

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These **3** *Eagle-Picher Bearing Metals meet most requirements*

1. **Dreadnaught** — for extreme speed and heavy-duty conditions.
2. **Outlasta** — for medium speed and average-load conditions.
3. **Durable** — for low speed and light-duty conditions.

BIG TIME TO OPERATOR AT 6000 FEET!

IF you specialize in top-to-bottom drilling to 6,000 feet, in servicing operations to 7,000 feet, or handle both, the spudder that can give you the "big time" service you want is a Bucyrus-Erie 48-L. Big Brother to the famous 36-L, 28-L, and 24-L machines, the versatile 48-L has proved itself thoroughly in field performance everywhere. Look over the outstanding features listed below . . . then contact your Bucyrus-Erie spudder distributor for detailed information on the 48-L, a BIG spudder for your BIG jobs.

TIME-SAVING MOBILITY: Semi-trailer (Tandem) and skid mountings for fast location-to-location moves.

SPEEDY RIGGING-UP: Power-raised and extended telescoping derrick with folding tubular braces enables four men to rig up completely within four hours.

SNAPPY SPUDDING ACTION: Direct-drive motion, with shock absorber that can be blocked out for deep drilling, means real drilling speed even in tough formations.

BIG CAPACITY: Swings up to 6,000 pounds of tools. Derrick capacity (with casing strut) up to 120,000 pounds; with auxiliary A-frame leg, 160,000 pounds.

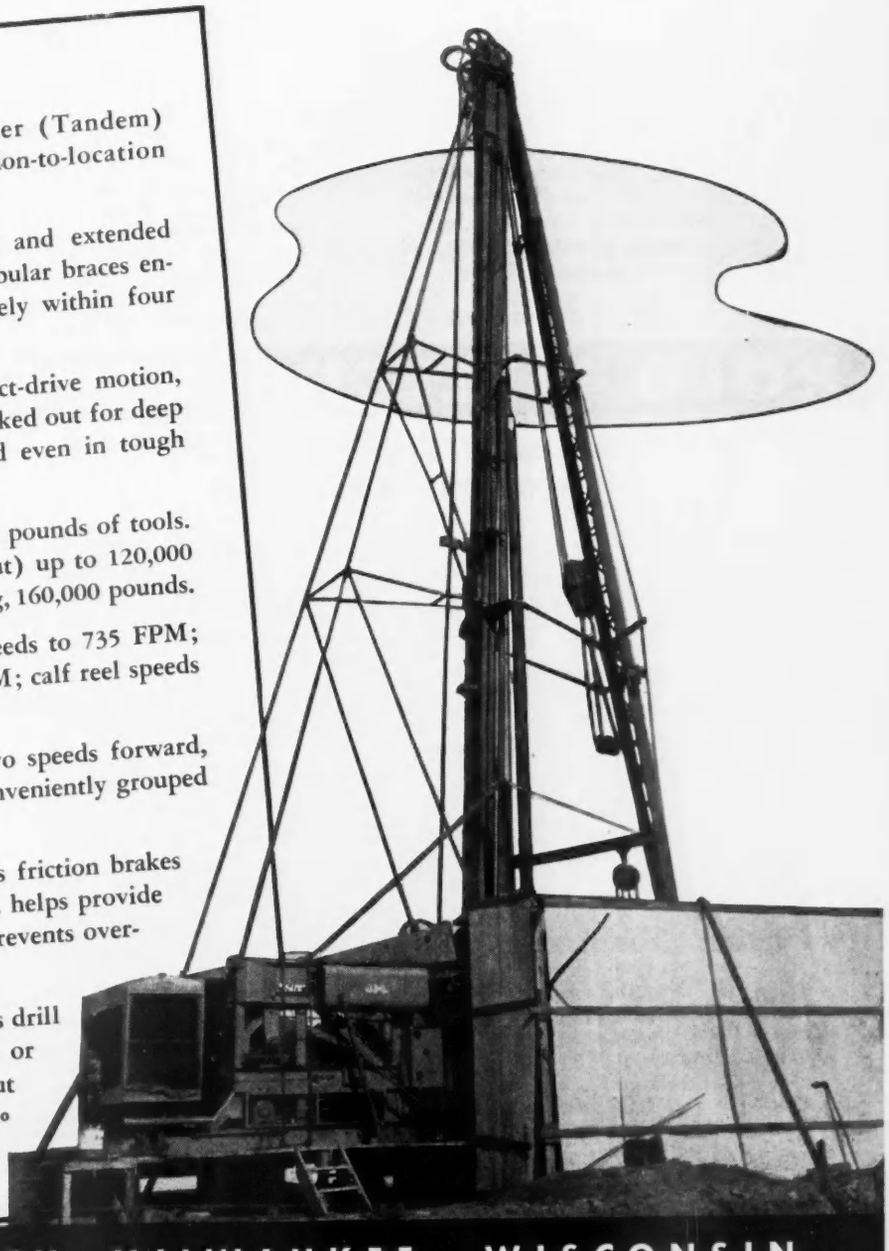
FAST HOISTING: Bull reel line speeds to 735 FPM; sand reel line speeds to 1,470 FPM; calf reel speeds to 510 FPM.

EASY, ACCURATE CONTROL: Two speeds forward, one reverse on all drums . . . conveniently grouped operating levers.

HYDROMATIC BRAKE: Augments friction brakes on bull, sand, and calf reels . . . helps provide accurate positive braking and prevents overheating of friction brakes.

AUTOMATIC SPOOLING: Winds drill line evenly across full width or any portion of bull reel without assistance of operator.

74550



BUCYRUS ERIE SOUTH MILWAUKEE, WISCONSIN

NEW LITERATURE

Pressure Multiplier Pump

A discussion of the operation and application of a pump which converts low pressure into high pressure is contained in a new brochure. The brochure describes uses of the pump in the oil fields for blowout preventer closing, pipe and pressure vessel testing; shop installations for testing Christmas trees, valves, etc.; the operation of punches, presses, and other hydraulic equipment. Four schematic illustrations are used to show the four operating cycles of the pump. Tables are given to show various pressure ratios which range from 14 to 1 up to 128 to 1; discharge volumes in gallons per minute. In addition, the brochure contains tables giving the air capacity and volumes required for operating different makes and sizes of blowout preventers and drilling valves.

For a copy of this brochure, write Brown Oil Tools, Inc., 2214 Campbell Street, Houston.

Diesel Engines

Baldwin Series 700 diesel engines are described in a new four-page bulletin, No. 320. These engines are four-cycle with a 17-inch bore, 20-inch stroke, and a speed range from 257 to 375 rpm. They have horsepower ratings ranging from 710 hp for 6-cylinder, normally aspirated, to 2080 hp for 8-cylinder, supercharged. Chief use is in stationary power services, such as pumping on oil or gas lines.

For a copy of this bulletin, write Baldwin-Lima-Hamilton Corporation, Philadelphia 42.

Trenching Machines

A 12-page catalog describes the Parsons Model 310 Trenchliner, and more than 50 photographs illustrate its high capacity production abilities. The 310 digs 17 feet deep and 1½ to 6 feet wide, in a range of 16 to 21 cutting widths.

For a copy of this catalog, write Parsons Company, Newton, Iowa.

Steel Filters

Properties, water flow and air flow of SMX stainless steel filters are outlined in a new eight-page booklet. Types of filters and their arrangements for various requirements are covered.

For a copy of this booklet, write Micro Metallic Corporation, 193 Bradford Street, Brooklyn, N. Y.

Power Units

A new folder describes the Harvester line of diesel engines and power units.

For a copy of form A-256-NN, write International Harvester Company, 180 North Michigan Avenue, Chicago 1.

Packings

Packings and piston rings for industrial service are described in a new 40-page book. Special attention is given to new developments in the Carbon-Bakelite process, Chrome-Plated piston rings and Teflon piston rings.

For a copy of this catalog, write Department F, France Packing Company, 6510 Tacony Street, Philadelphia 35.

Motor-Generator Sets

A new eight-page, two-color booklet covers synchronous motor-generator sets from 30 to 8000 kw as a source of d-c power for many industrial applications. The booklet shows four typical installations and describes construction features.

For a copy of booklet GEA-5506, write General Electric Company, Schenectady 5, N. Y.

Pump and Motor

Design and construction features of a close-coupled pump and motor are described in the bulletin "Electrifugal Pump." The Electrifugal has a single shaft mounted in a unit-cast frame. It is available with drip-proof, splash-proof, totally-enclosed, fan-cooled or explosion-proof motor enclosures. Ratings from 10 to 500 gallons per minute at heads to 220 feet are available.

For a copy of Bulletin 52B6140B, write Allis-Chalmers Manufacturing Company, 1063 South 70th Street, Milwaukee.

Solenoid Valves

Johnson direct operated solenoid valves are described in an eight-page catalog, which lists sizes from ½-inch to three inches; valves for normally open or normally closed service; stainless steel or Jenkins disc seats; valves with dash-pot construction to stop water hammer; three-way solenoid valves, etc.

For a copy of this catalog, write Johnson Corporation, Three Rivers, Mich.

Spinning Chain

TM Alloy steel spinning chain is the subject of a bulletin which contains prices, details and specifications.

For a copy of Bulletin 76, write S. G. Taylor Chain Company, Hammond, Ind.

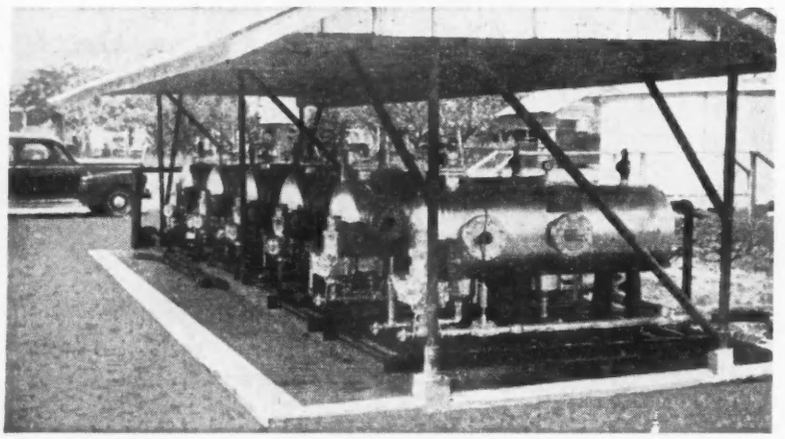
Saturation Control

A recording and controlling instrument which operates on the psychrometric wet- and dry-bulb principle, the TAG Saturation Controller, is covered in a new catalog, "TAG Fully-Automatic Control for Saturation Control of Natural Gas."

For a copy of catalog No. 1287, write Weston Electrical Instrument Corporation, 614 Frelinghuysen Avenue, Newark 5, N.J.

ROLO WELLCHECKERS

PERMANENT AND PORTABLE OIL AND GAS SEPARATORS



This battery of six skid-mounted 4-1H-2406 Rolo Wellcheckers makes it possible to produce six one-well leases into a single tank battery. Installations of this type, of which Rolo Mfg. Co. has made many, are approved by regulatory bodies. Let us work with you on your problem.

Rolo Wellcheckers are made in all sizes to fit any operation. See Composite Catalog or write for illustrated Bulletin.

Crude Oil Metering Specialists

ROLO MANUFACTURING COMPANY

2510 South Blvd., Houston 6, Texas

BRANCHES: Corpus Christi, Midland, Kilgore, Tulsa, New Orleans, Los Angeles, Casper, Calgary, (Alta.)

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Formerly known as the American Iron & Machine Works Company Rental Division—the six well-equipped rental yards, located strategically over the Mid-Continent Area, are now owned and operated by the Associated Oil Field Rentals, Inc.

We want to assure you that our plan of operation places full emphasis on the continued maintenance of all rental stocks at top-performance quality—PLUS a friendly, dependable day and night service. We shall continually strive to make this the kind of service you desire. Your suggestions, as well as patronage, will be greatly appreciated.

ALSO

- DRILL COLLARS
- KELLYS
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- CORE BARRELS
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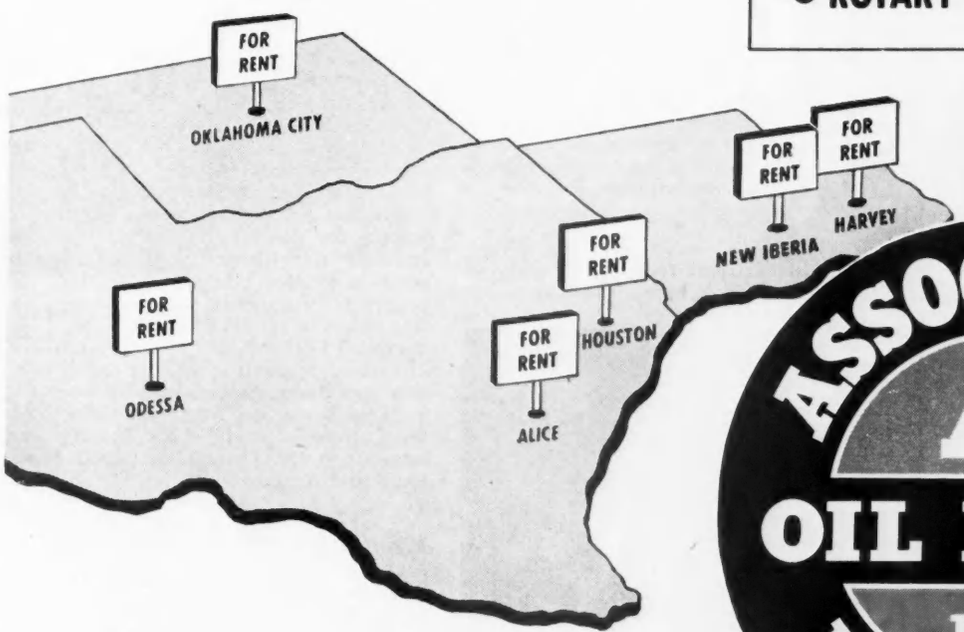
- ROTARY SLIPS
- Blowout Preventers
- ROTARY TONGS
- ELEVATORS
- ROTARY SUB



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QUICK, ACCURATE RESULTS
LESS EFFORT
Curtin CENTRIFUGES

No. 3420
15 c.c. machine . . .
Cranks and heads interchangeable with 100 c.c. machines.

Simple in design . . . Ruggedly built . . . Requires no special care . . . Great Ratio and throw of crank produce required speed with no strain. Curtin Centrifuges meet all *A.S.T.M. Standard Method D-96* and *A.P.I. Code No. 25* requirements. Fully descriptive literature upon request.

W·H·CURTIN & CO.
HOUSTON . . . . NEW ORLEANS.

L-O-N-G-E-R
THREAD LIFE

1. EXCLUSIVE 500-TON SPECIAL prevents washouts and galling. Makes breaking out easier; withstands highest pressures, and is unaffected by heat and moisture!
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Men in the Industry NEWS

Forrest M. Darrough, general counsel and head of the Legal department of The Carter Oil Company, has been elected a vice president of Carter. He has been a director of the company since 1944.

•

W. F. Dau has been elected a director of Sinclair Oil Corporation to fill the vacancy caused by the recent death of **William P. Phillips.** Dau joined the Sinclair organization in 1917 as an employe of the Accounting department at Chicago. He was transferred to the Treasury department in 1921 and rose to the post of vice president and assistant treasurer in 1943. In June, 1949, he was elected treasurer, which position he now holds.

W. F. Dau

•

J. R. Polston, former general manager, and **R. J. Andress,** former director in charge of traffic, Service Pipe Line Company, have been elected vice presidents of the company. **C. M. Scott, Jr.,** former assistant general manager, succeeds Polston as general manager.

•

Carl Nilsen, geologist for The Carter Oil Company at Oklahoma City, has resigned to join Union Oil Company of California.

•

Ralph E. Boggess, formerly with Robinson, Shipp and Robertson, Oklahoma City, has joined **Kenneth A. Ellison,** independent operator, as head of the newly-created Land and Legal department.

•

J. Howard Marshall, formerly president of Ashland Oil & Refining Company, has been elected vice chairman of the board, as an operating executive directly under **Paul G. Blazer,** who was re-elected chairman of the board. Marshall will be relieved of various detailed administrative duties to provide more time for general activities but will continue to assume direct responsibility for the crude oil operations of the company.

J. Howard Marshall

•

James L. Martin, a director of the company for more than 30 years, was elected chairman of the executive committee, and **Rexford S. Blazer** was chosen as the new president. Other officers were re-elected.

Robert E. Spann has joined the editorial staff of WORLD OIL as Eastern District Editor. His new York City headquarters will be at 250 Park Avenue.

A former staff writer for *The Wall Street Journal,* Spann covered the petroleum and natural gas industries in New York City as assistant to the petroleum editor from 1946 through 1947. In 1947 he transferred to Dallas in connection with the organization of the Southwest Edition of *The Wall Street Journal,* and, until he resigned to join WORLD OIL, handled oil and gas news as well as economic developments in other industries.

Educated at the University of Alabama, Spann was graduated in 1942 with a B.A. degree, majoring in journalism with minor in economics. He served in the Navy during World War II, and was released in 1946 with the rank of lieutenant.

•

Joseph O. Kremer was named manager of Deep Rock Oil Corporation's insurance department succeeding **C. E. Tillman,** retired.

Tillman, once a bookkeeper for oilman **C. B. Shaffer** who discovered the Cushing (Oklahoma) field, served Deep Rock and predecessor companies for 34 years. He had been in charge of the firm's insurance matters since 1925.

Kremer has had 14 years' experience in the insurance field. He received his B.A. degree from Williams College in 1936.

•

Paul F. Barnhart, consulting petroleum engineer and independent oil operator, formerly with **Frank** and **George Frankel,** oil producers, has opened his own offices at 1228 Commerce Building, Houston. As general manager of operations, Barnhart actively assisted the Frankels in development of oil properties, and will continue to act as consultant for them. A graduate petroleum enginer of the University of Oklahoma, Barnhart was with Barnsdall Oil Company from 1936 to 1942 in various positions in drilling and production operations. At present he is operating in West Texas and Northeast Colorado in the Denver-Julesburg Basin, besides other interests in the Texas Gulf Coast, Mississippi, and Arkansas.

Paul F. Barnhart

•

Maurice A. Brewster has retired as vice president and secretary, Pennzoil Oil Company, Oil City, Penn. He continues as company director.

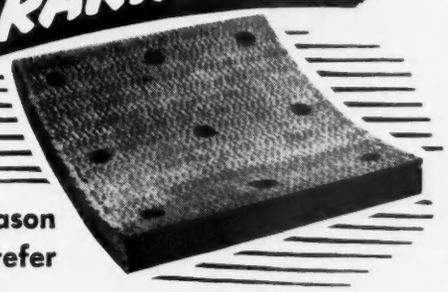
•

O. P. Brown has resigned from the geological staff, Shell Oil Company, to open regional offices in Denver for Wilshire Oil Company.

•

Brooks Hall has resigned as geologist, Stanolind Oil and Gas Company, to be a consultant in Wichita, Kansas.

SMOOTHNESS OF BRAKING...



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S & R Mud Pits are practically indestructible . . . with any reasonable care in loading and transporting, they will give years of service.

Standard pits are 6 feet deep, 30 feet long, 7′ 6″ wide and have a capacity of 234 barrels. Bottoms are ¼″ steel plate; sides of 3/16″ or ¼″ as specified. Heavy reinforcing . . . 3″ channel iron ribs on 36″ centers . . . provides utmost strength and rigidity along the sides. Top cross braces are above the mud level in the tank, so that the interior is absolutely free of obstructions. A clean-out plate is furnished at one end.

S & R Steel Mud Pits are skidded on 6″ H-Beams, with heavy cross-braces along the length. Skids are 8 feet wide and 33 feet long; the pits may be hauled on any standard oil field trailer. Beams are recessed at each end, so that the winch line may be snubbed or wrapped around the ends of the braces for speed, safety and convenience in loading and unloading.

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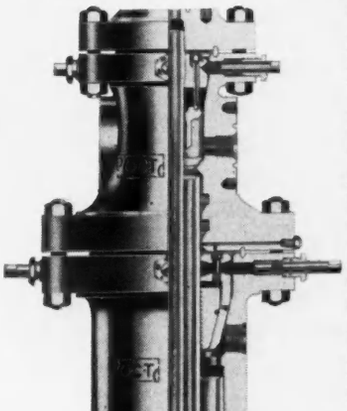
Beaumont Well Works is equipped with the tools and the know-how to strengthen your product with forgings. Carbon, alloy, and stainless steel forgings made to your specifications will help reduce your costs of manufacture and will put more sales appeal in your product. Now, without investing a cent in forge equipment, you can compete successfully with the largest manufacturers of oil field equipment. Investigate the advantages of steel forgings, then call on Beaumont Well Works for specific engineering and manufacturing information concerning your product.



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Commemorating the Fiftieth Anniversary of Spindletop.

BEAUMONT WELL WORKS COMPANY

INCORPORATED

BEAUMONT, TEXAS

Thomas J. Bevan, formerly a partner in Mayes-Bevan Company, has opened offices as consulting geophysicist at 809 Palace Building, Tulsa. He is specializing in the interpretation of gravity information and its integration with other geophysical and geological data.

•

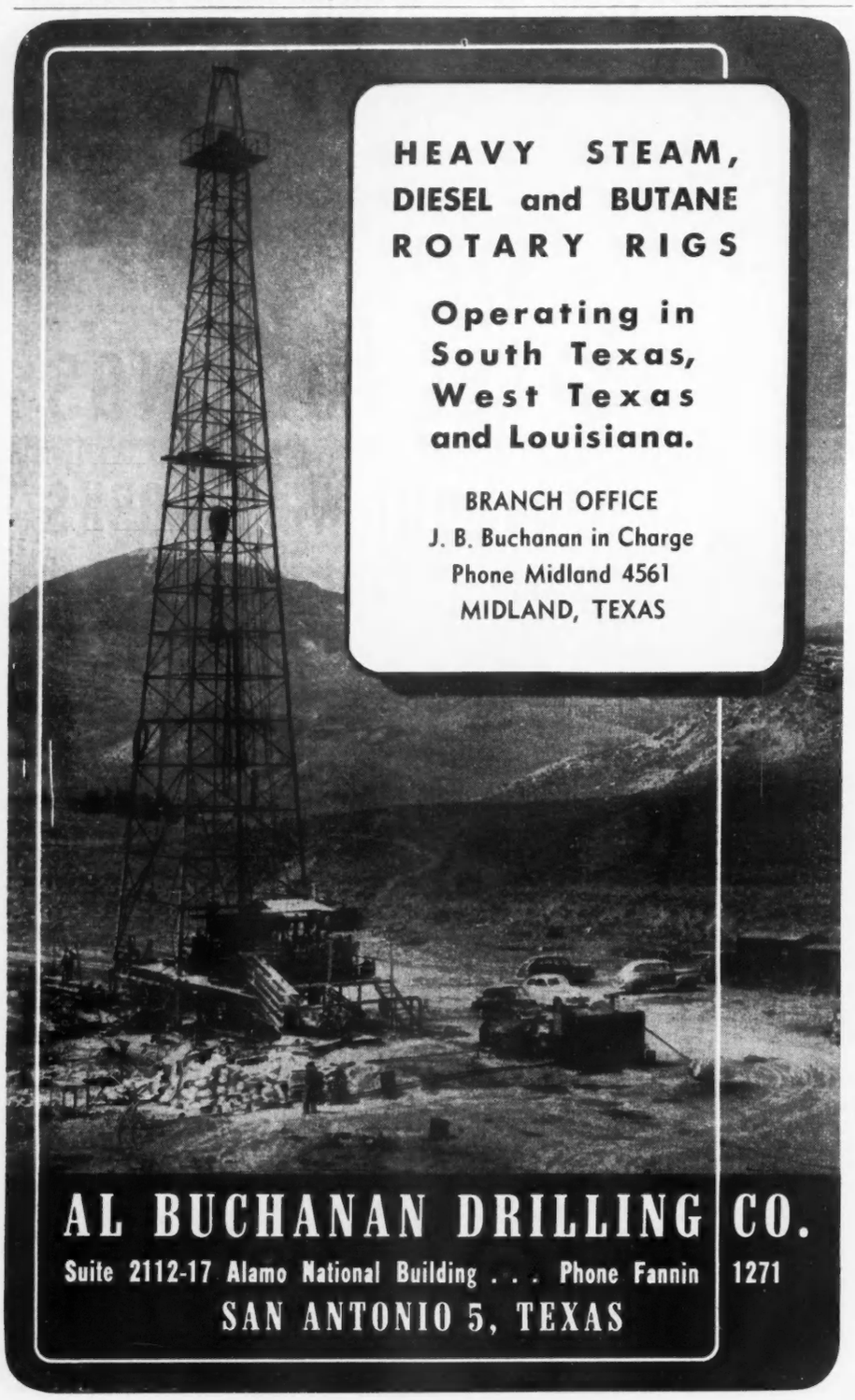
C. Jared Ingersoll, Philadelphia industrialist and civic leader, has been elected to the board of directors of The Atlantic Refining Company. He is president of the Muskogee Company and chairman of the board of its subsidiary companies, as well as a director of several other corporations.

Rayburn L. Foster has been named vice president and general counsel of Phillips Petroleum Company, and has been succeeded as assistant general counsel by **Harry D. Turner.** Turner is also general attorney, an office now consolidated with that of assistant general counsel.

Foster joined Phillips in 1930 and Turner has been with the company since 1937.

•

James K. Murphy resigned as secretary-treasurer and geologist for Norbla Oil Company, Tulsa, and has organized the Miners Oil Company of Delaware, with offices in the Philtower Building, Tulsa.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SAN ANTONIO 5, TEXAS

Chester C. Clark, former Shreveport district geologist, Union Producing Company, has retired after 20 years service. He will enter consulting practice in Shreveport with headquarters at 412 Pierre Mont Road.

•

Herbert E. Schnur has been promoted to assistant comptroller of The Texas Company. Schnur has spent his entire business career with Texaco, starting in 1930 as an accountant at the Houston office. As a traveling auditor he traveled extensively in the U. S. and abroad. In 1942 he entered the Army as a private and was discharged in 1946 with the rank of captain. He won the Legion of Merit for work in connection with enemy oil intelligence. He returned to company service in 1946 as a special auditor in the New York office. His new headquarters will be in Houston.

Herbert E. Schnur

•

J. R. Wright has been named district superintendent of the Houston and Beaumont districts of Magnolia Pipe Line Company, with headquarters in Houston.

•

J. F. Minnette has been appointed head of the Land department of Ryan Oil Company, Evansville, Ind.

•

Howard Van Zandt, for eight years head of land and exploration activities for Duval Sulphur and Potash Company, has resigned to re-enter the oil business with offices in the Mellie Esperson Building, Houston.

•

Charles Dunlap, former area industrial relations supervisor in West Texas for Service Pipe Line Company, now holds the same position in the Illinois-Missouri divisions. **Paul E. Carrithers**, Fort Worth area industrial relations supervisor for East Texas, will temporarily assume Dunlap's West Texas duties.

•

Dr. Allan Cree is district geologist of the new district land and exploration office of Cities Service Oil Company (Del.) at Billings, Mont. **J. A. McIntosh** is district development geologist **Richard Model**, geological scout, **Mac Fitts**, district geophysical supervisor, and **C. O. Kimpel**, district landsman.

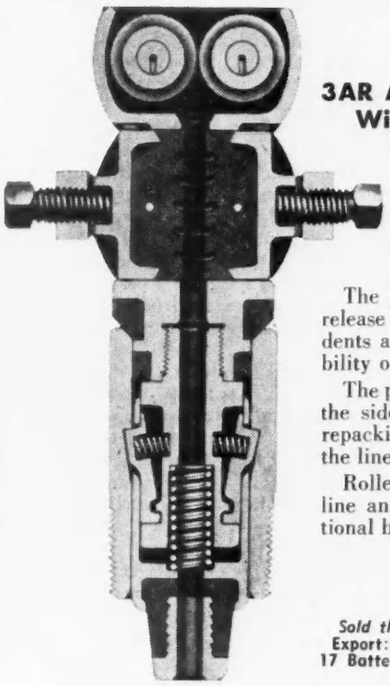
•

A. W. Cullen, British American Oil Producing Company, has been appointed manager of exploration, Rocky Mountain area, with headquarters in the company's new exploration office in Denver.

•

S. R. Durkee, treasurer of Superior Oil Company, Los Angeles, has been elected to membership in the Controllers Institute.

FOR SWABBING— *Be Sure* IT'S A KING *Be Safe* —FOR CORING



3AR Automatic Release Wire Line Stripper

Type 3AR King Wire Line Stripper is the ideal tool for use in swabbing operations.

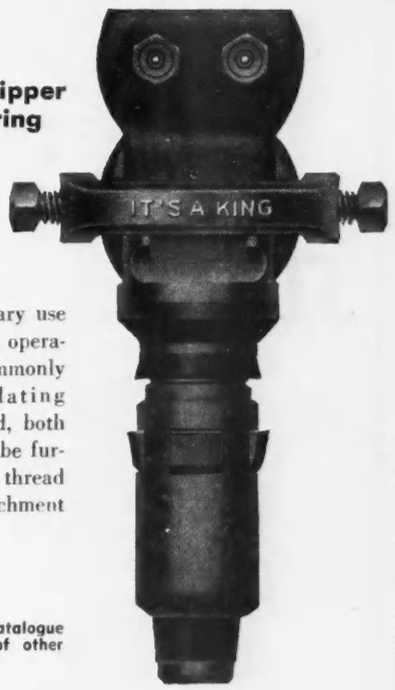
The positive latch and sure release insure against accidents and eliminate the possibility of breaking a line.

The packing is inserted from the sides of the stripper and repacking is easily done while the line is in the hole.

Roller line guides center the line and outwear the conventional bushing.

4AR King Type Stripper For Wire Line Coring

Type 4AR Wire Line Stripper is similar to the 3AR, except it is a little larger. Although it can be used for swabbing, its primary use is for wire line coring operations. The 4AR is commonly used with King circulating heads. When required, both the 3AR and 4AR can be furnished with 1½" pipe thread on the bottom for attachment to a trip bar.



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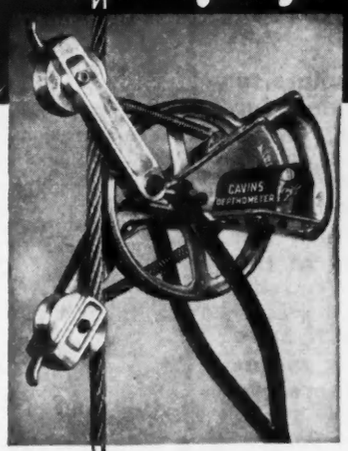
Why Guess ABOUT WIRE LINE MEASUREMENTS?



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The Cavins DEPTHOMETER is a simple, compact, direct-reading device that obsoletes "stringing-in" and gives you accurate measurements in very little more time than it takes to make a trip with your bailer. Comes in a handy carrying case (weighs only 17 pounds)—readily taken to any well—put on the line in a few seconds—priced to pay for itself quickly.—Write for illustrated folder.

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It will pay you many times over to investigate Lone Star's improved, automatic process of building up drill collars.

By shipping drill collars to the Lone Star plant for build-up, you profit 2 ways:

(1) You gain assurance of uniform, faultless workmanship which can be attained only at the plant . . .

(2) You pay less. Lone Star's process is materially faster, therefore less costly.

Write today for complete information.

LONE STAR ★ TOOL COMPANY

WICHITA FALLS, TEXAS

Transfers and Promotions:

Keith Bennett from the Denver land and leasing office, Continental Oil Company, to the Julesburg Basin covering southern Colorado and western Nebraska. In Continental's Western region, **F. C. Havens**, assistant to the regional manager, to Platte Pipe Line Company, an affiliated company, as treasurer, with headquarters at Independence, Kansas . . . **Thomas Pennington, Jr.**, marine equipment engineer of the Marine Equipment division, Humble Oil & Refining Company, Houston, to Petroleum Engineering division, Houston, as senior supervising petroleum engineer. **Fred W. Stover**, compressor plant foreman, Seeligson compressor plant, promoted to gas plant superintendent at the Clear Lake gasoline plant. **J. W. Workman**, assistant cycling plant superintendent, Katy gas cycling plant, to Trawick gas system as district gas superintendent. . . . **Fred G. McMullen**, Land department, Stanolind Oil and Gas Company, from Tulsa to Oklahoma City . . . **W. H. Pattison**, Deep Rock Oil Corporation, from Wichita, Kansas, to Denver to open a new district office. **Kenneth Webb**, Deep Rock geologist, to Sterling, Colo. . . . **Glen D. Michel**, landman, Bay Petroleum Company, from Midland, Texas, to Oklahoma City. . . . **Earl E. Boyd**, Warren & Bradshaw Drilling Company, from Ardmore, Okla., to Oklahoma City. . . . **Gene R. Southwick**, geologist, Sinclair Oil and Gas Company, from Enid, Okla., to Oklahoma City.

George Crawford, The Carter Oil Company, scout at Evansville, Ind., succeeding **M. C. Munson**, transferred to Vernal, Utah. . . . **Vic J. Veroda**, geologist, Republic Natural Gas Company, from Oklahoma City to Hugoton, Kansas. . . . **R. E. Minnis, Jr.**, Phillips Petroleum Company, from Shawnee, Okla., to Oklahoma City as district geologist for the combined Oklahoma City-Shawnee districts. **W. E. McMurtry**, from Shawnee to Oklahoma City as assistant district geologist for the combined districts. . . . **Frank Poorman, Jr.**, Shell Oil Company regional staff, to Oklahoma division as member of the Mechanical Engineering department. **A. E. Cordray**, Shell exploitation engineer, from Ardmore, Okla., to Tulsa. **R. F. Wicks**, promoted to assistant district superintendent and transferred from Elk City, Okla., to Great Bend, Kansas. **F. R. Versaw**, district geophysicist, from Tulsa to Denver. **J. D. Boswell**, mechanical engineer, from Tulsa to Lake Charles, La. **R. C. Loring** and **J. E. Walker**, Exploration department, New Orleans, to Calgary, Alberta, on special assignment. **V. L. Culbertson**, surface geologist, from New Orleans to Jackson, Miss. . . . **Ira J. Meador**, engineer for Skelly Oil Company at Monahans, Texas, to Lindsay, Okla., as production foreman. **Ben H. Ploch**, scout at Evansville, Ind., to Jackson, Miss. . . . **Andros (Dusty) Guilde**, consulting geologist, from Carmi, Ill., to Evansville. . . . Promotions by British American Oil Producing Company include those of **J. F. Lanthrip**, from chief of the budget section to assistant treasurer, and **Jack McReynolds**, from section chief of the crude oil and sundry accounts section to supervisor of the Accounting division. . . . **Joe B. Randol**, mechanical engineer for Pan American Pipe Line Company, Longview, Texas, promoted to assistant to the purchasing agent, Houston. He is replaced by **R. A. Andrews**, formerly mechanical engineer at Alvin, Texas.

Kenneth R. Joynt, production foreman in the Falfurrias district, Magnolia Petroleum Company, promoted to assistant district superintendent of the Lake Charles district, Producing division. **James G. Sadler**, promoted from assistant foreman at Falfurrias to production foreman. **James M. Henagan, Jr.**, promoted to petroleum engineer II and transferred from Lake Charles to Shreveport to do reservoir and evaluation work in the Shreveport Producing division. **Emil C. Pela**, petroleum engineer in the Healdton Producing district, to Lake Charles district with headquarters at Mamou, La. **J. G. Litherland, Jr.**, from Falfurrias to West Texas division with headquarters in Midland, to do reservoir and evaluation work. In Magnolia's Land department, **John T. Jones**, district land man for Oklahoma, from Oklahoma City to Calgary, Alberta, as manager of the Land department of Socony-Vacuum Exploration Company, affiliated organization of Socony-Vacuum Oil Company, Inc. He is replaced by **Grayson Ray**, formerly district land man at Wichita Falls. **Marvin S. Jones**, Land department staff at Dallas, to Wichita Falls as district land man. **William K. Brewster**, from Oklahoma City to general offices in Dallas.

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Drilling Rig built for Rowan Drilling Company, Inc.

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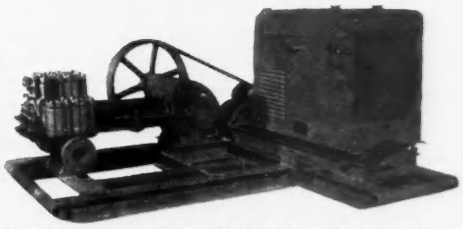

SPECIFICATIONS: GASO Model 1860, 4½" x 6". Totally enclosed Duplex Power Pump, Timken bearing equipped, side pot type fluid cylinders, bronze wing guided valves, stainless steel rods, pump furnished with 2½", 3", 3½", 4", 4½" cast iron liners with steel rings whichever size requested. 4" suction and discharge. Pump has 28.8", 5-C Groove Sheave.

Liner Size	Pressure Lbs./Sq. In.	DISPLACEMENT 70 R.P.M. GPM	70 R.P.M. BPH	90 R.P.M. GPM	90 R.P.M. BPH
2½"	900	32	46	41	59
3"	600	47	67	61	87
3½"	450	65	93	85	121
4"	350	88	126	112	160
4½"	300	112	160	144	205

Note: Bronze liners and pistons can also be furnished at slight additional cost.

CHRYSLER C-36 Industrial 9, Eight cylinder engine, 323.5 cu. in. displacement, complete with starter, generator, large radiator, air cleaner, oil filter and clutch with sheave and 5-C-144 V belts, gasoline carburetor. Engine is fully enclosed. Less battery.

50 H.P. CONTINUOUS AT 1200 RPM

Reconditioned unit has 2 piece steel H-beam skid as shown. Shipping weight approximately 6000 lbs. for unit.

Halloran Equipment Co.

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Kirby Petroleum Company

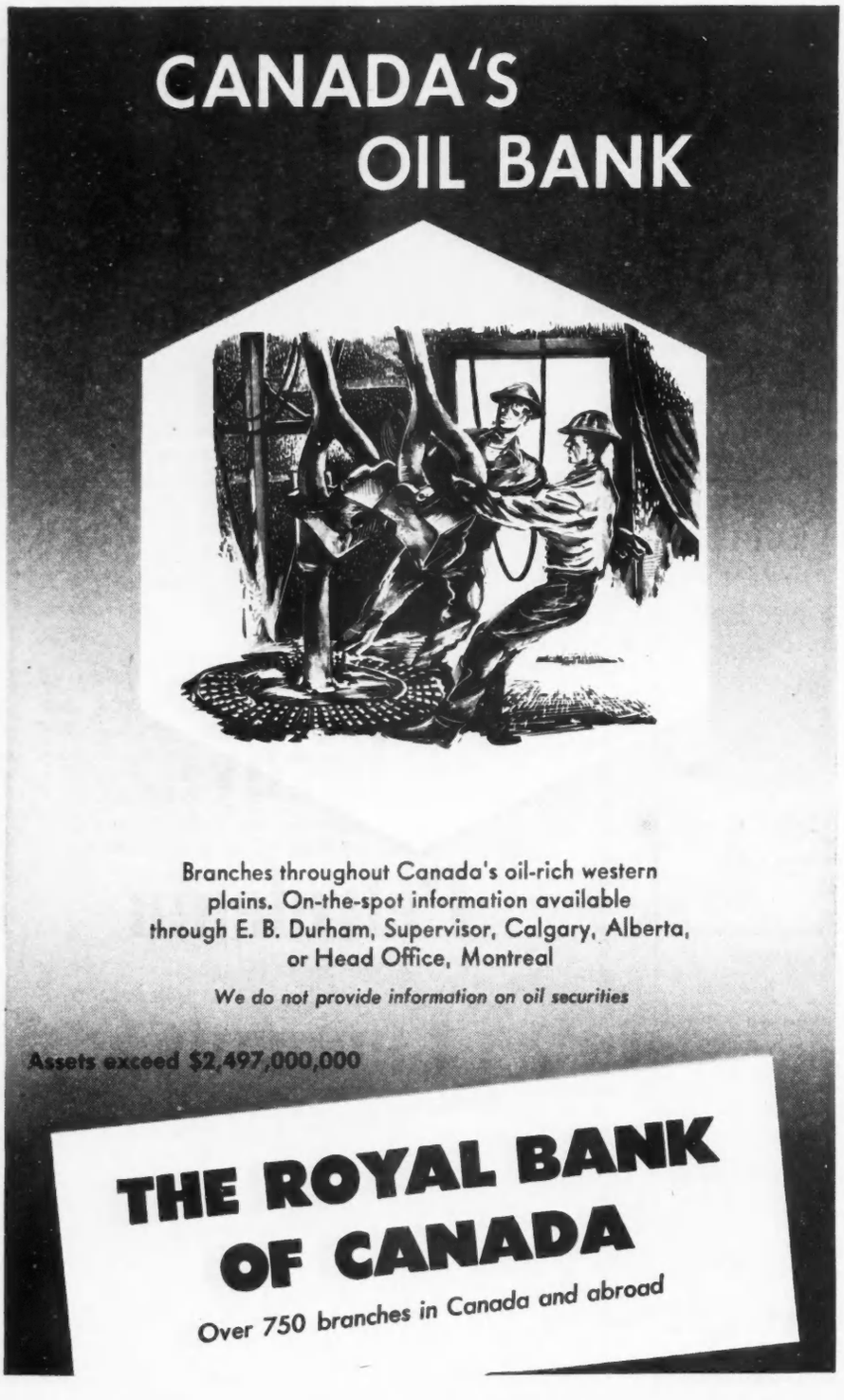
Richard G. Lawton, president of Lawton Oil Corporation, Magnolia, Ark., has been appointed director of the production division of the Petroleum Administration for Defense. Lawton, a graduate of the University of Oklahoma, entered the oil industry as a member of a drilling crew in the Ranger, Texas, field. While engaged in geological work in north Louisiana and Arkansas, Lawton formed a partnership with the McAlester Fuel Company, coal and oil producers of McAlester, Okla., and was placed in charge of the company's oil and gas development and production. He participated in the discovery of several Arkansas fields. After 15 years with the McAlester Company, he organized the Lawton Oil Corporation in August, 1950, with headquarters at Magnolia. The company operates in Arkansas, Louisiana, Texas and New Mexico.

•

Ray Chorney, formerly division geologist, Pacific Western Oil Company, Casper, Wyo., has joined Union Oil Company of California at Casper.

•

Ed Hannum has resigned as district geologist in Southern Oklahoma for The Texas Oil Company to become a consulting geologist.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Branches throughout Canada's oil-rich western plains. On-the-spot information available through E. B. Durham, Supervisor, Calgary, Alberta, or Head Office, Montreal
We do not provide information on oil securities
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THE ROYAL BANK OF CANADA
Over 750 branches in Canada and abroad

J. H. Forrester has been named manager of Stanolind Oil and Gas Company's Central division, replacing **J. E. Swearingen,** division manager in Oklahoma City, who returns to Tulsa as executive assistant to **A. L. Solliday,** executive vice president. Forrester joined Stanolind in 1946 and has been manager of Stanolind's Manufacturing department since January 1, 1947. Previously, he had been associate director of research and director of technical service for Standard Oil Company (Indiana).

J. H. Forrester

•

Glenn W. Ditworth, geologist with The Texas Company for the past 14 years, has resigned to become a consultant at Shawnee, Okla.

•

Lee H. Cornell has resigned as geological scout in Kansas for Stanolind Oil and Gas Company to join the Franco-Central Oil Company, replacing **J. F. Ralstin,** resigned.

•

Edward W. Ames, geologist, has been named manager of Rock Hill Oil Company, offices in Suite A-1, Windsor Hotel Annex, San Antonio.

•

Stanley Spaulding, former land man at Casper, Wyo., is now land man for **Walter Davis,** independent, at Casper.

•

Joe B. Houston, John R. Cartmill and **G. H. Murray** have organized the Prugh Petroleum Company, with offices in the Drew Building, Tulsa.

•

J. S. Royds has been named division geologist, Continental Oil Company, Denver, succeeding **A. E. Brainerd,** retired.

•

N. W. Engel, formerly at Midland, Texas, replaces **Ken Gow,** resigned, as district geologist for Superior Oil Company, Denver.

•

N. D. Bernard, Amerada Petroleum Corporation, is in charge of the company's new district land office at Denver.

•

A. G. Anderson, general traffic manager of Socony-Vacuum Oil Company, Inc., was elected president of the National Industrial Traffic League at its annual meeting in San Francisco.

•

Arthur G. Blauner, independent, has moved from Tulsa, Okla., to 131 East 2nd Street, Atoka, Okla.

•

Kenneth B. Boling has resigned from the Geological department, The Pure Oil Company, to become a consulting geologist at Evansville, Ind.

CIRCULATE ABOVE THE PACK-OFF WITH *New* GUIBERSON *KV30P*

Perforated-Mandrel Control Head Packer

The KV30P is designed especially with a perforated mandrel for free fluid circulation ***ABOVE*** the packer when valve is open. Special seal in shell prevents circulation through the packer shell. Positive pack-off is obtained when valve is closed. Two independent sealing elements in the valve, a tapered metal valve and seat and a set of oil-resistant seal rings, afford double-sealed protection.

Both the KV30P and the regular KV30 allow a 30" opening valve stroke before packer setting is disturbed. Use the KV30 or the KV8 for standard below-packer circulation. The KV8 is the same packer as the KV30 but with 8" valve stroke. All three packers have the same husky construction, varying only in point of circulation and length of valve stroke.

With these KV Packers you can *conserve* gas pressure... *extend* the flow life of your well and produce at *lower lift cost*.

Newly designed one-piece packing rubber molded from special compound gives positive pack-off, yet pulls easily and will not vulcanize to casing wall.

Two-piece "G2" rubbers with metal spacer are interchangeable and optional at no extra cost if desired.

Write today for Guiberson's new 1951 catalog!

THE GUIBERSON CORPORATION

ESTABLISHED 1919 • DALLAS, TEXAS, U. S. A.

Sold By Leading Oil Field Supply Stores Everywhere

DEATHS

Edwin E. Hedene, 54, chief engineer of Nordstrom Valve division, Rockwell Manufacturing Company, died December 28 in Pittsburgh. Before moving to Pittsburgh, Hedene had been chief engineer of the Nordstrom Valve plant at Oakland, Calif. For the past several years he had devoted his efforts to coordinating Nordstrom engineering activities at the Pittsburgh, Hopewell, Oakland and East Chicago plants.

•

Richard H. Thomas, 87, founder of Hamilton-Thomas Corporation, Hamilton, Ohio, died December 30. From 1914 until 1947 Thomas was president of the Hamilton-Thomas Corporation, a firm composed of Liberty Machine Tool Company, Klipfel Company, and Smith & Mills Shaper Company.

Harry Stekoll, 57, founder and president of the Stekoll Petroleum Corporation, died January 21, in Palm Springs, Calif. Besides his oil interests which were extensive, he was a prominent rancher and owner of the famous Honey Creek ranch in Oklahoma.

•

Mrs. Helen Jeanne Plummer, 59, research scientist in the University of Texas Bureau of Economic Geology, died January 11 in Austin, Texas. She was known in the Texas oil industry as a top authority on core samples.

S. W. Webster, manager of Mid-Continent machinery sales for Emsco Derrick & Equipment Company, died December 16 in Dallas. His headquarters had been in Dallas in the main office of Emsco's distributor, The Continental Supply Company. Webster, who had been with Emsco for 22 years in the Mid-Continent area, was a native of California and attended high school and college in Los Angeles.

S. W. Webster

•

Henry Brosius Krohn, Sr., 50, retired oil operator, died January 18 in Houston.

•

C. S. Washburn, 60, longtime engineer with Mid-Continent Petroleum Corporation, Tulsa, died January 10.

•

Harrison F. Carr, 65, veteran Louisiana oil and gas man and president of the Petroleum Club of New Orleans, died January 1. For the past 23 years he had been district manager in the Baton Rouge and New Orleans areas for United Gas Pipe Line Company and Union Producing Company. He retired November 1, 1950.

•

Henry Harold Wheatley, 54, a member of the management of Iraq Petroleum Company, died in England December 10. Wheatley, who had been with the company since 1938, had previously been in the service of the Iraq government.

•

Cecil L. Redman, 49, of Tulsa, automotive superintendent for Shell Oil Company in the Tulsa area, died January 8.

•

Don Kirk Chichester, 48, independent Oklahoma oil man, died December 14 in Bixby, Okla.

•

James T. Maloney, 75, retired Oklahoma oil driller, died December 31 in Tulsa.

•

John P. Hoelzel, 67, president of Pittsburgh Screw & Bolt Corporation, Pittsburgh, died December 26.

•

William Brown Bell, president of American Cyanamid Company, died December 20 while on a business trip in Marrakech, French Morocco.

•

George L. Pace, 68, president of Pace Petroleum Company, died December 26 in Duncan, Okla.

•

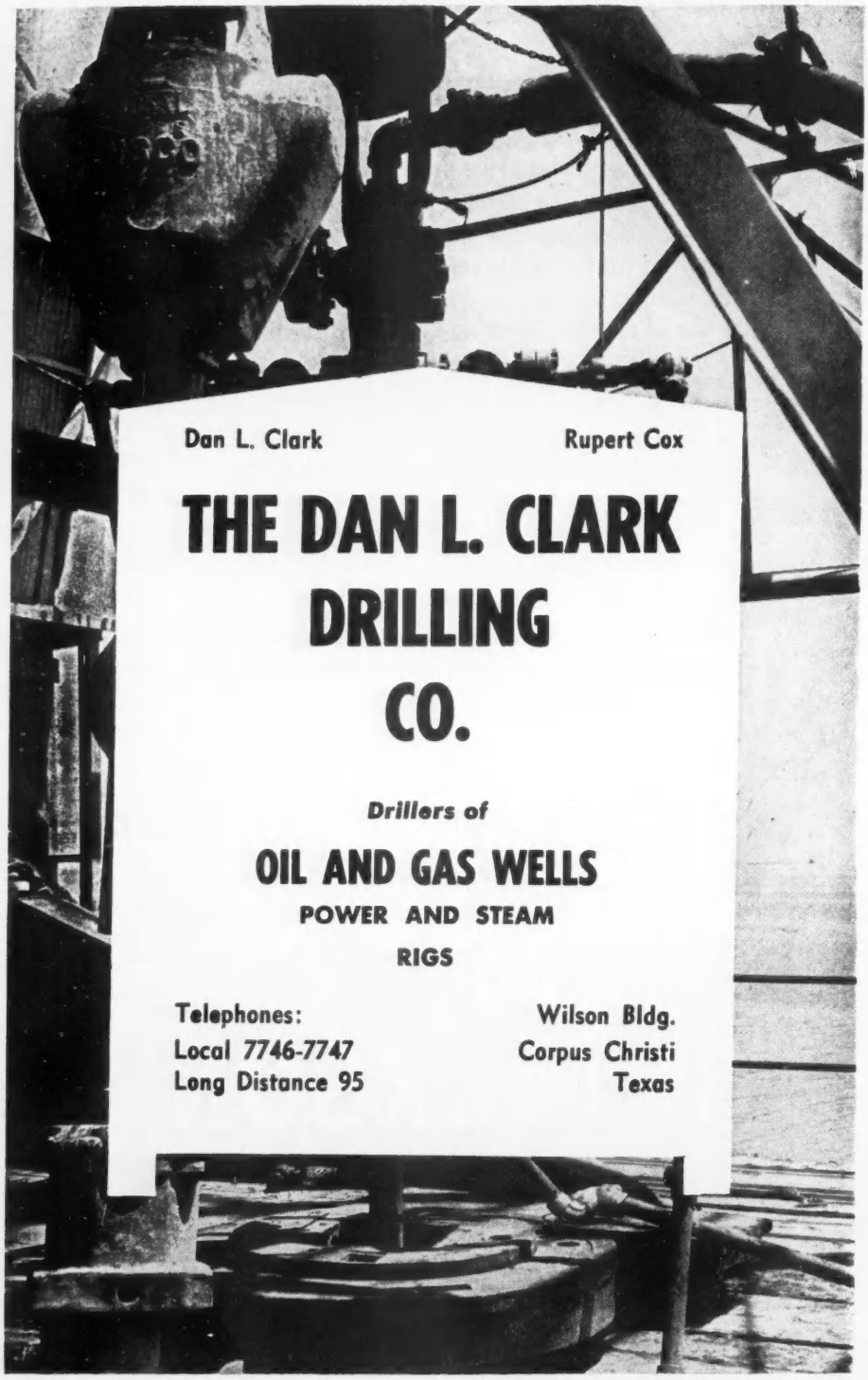
Edward Green, 81, retired Oklahoma oil field contractor, died December 31 in Glenpool, Okla.

•

Frank Leslie Scott, 51, president of Scott Drilling Company, Tulsa, died December 24.

•

Earl G. LeSage, 45, comptroller and purchasing agent for Regan Forge and Engineering Company, died in San Pedro, Calif.

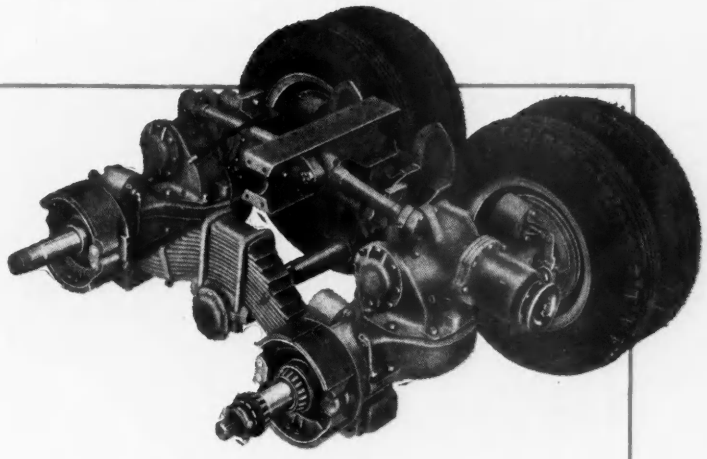


MACKS make light of heavy loads . . .

Big Mack super-duty trucks make the hard jobs look easy...because in design and construction they incorporate numerous outstanding features that contribute to easy maneuverability, ease of control and positive traction regardless of terrain.

Powerful Diesel Engines! Hydraulic Power Steering! Air Assist Clutch! Flexible Rubber Shock Insulators! Mack's famed Balanced Bogie and Power Divider. All are Mack features that assure power and strength for the heaviest loads; flotation and traction for the most slippery mud or sand.

Your nearest Mack branch or distributor will give you the full story on what Macks can do for you in trouble-free, uninterrupted schedules... greater profits through greater output at lower cost. You'll find it's a story well worth hearing.



Only Mack gives you all the advantages of the famed Balanced Bogie. Positive traction because of exclusive Power Divider. No spring twist because of Mack Rubber Shock Insulators. Inherent flexibility eliminates chassis distortion. Extended tire life because of uniform tire loading. Minimum maintenance because of simplicity of design.

Mack TRUCKS

...outlast them all

Mack Trucks, Empire State Bldg., New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; Long Island City, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

NO CONNECTION LEAKS!

RECTORSEAL #1

Thirteen years of successful use by the oil industry prove it! Rectorseal #1 positively prevents connection leaks on mud, steam, fuel and water and other drilling rig lines. It is perfect for casing couplings.

Rectorseal #1 is thin in the can for easy, economical application . . . it thickens in the joint for permanent protection against leaks. It will not freeze the joint.

Ask your supply store for Rectorseal #1 . . . . keep a supply on your drilling rig.

RECTORSEAL, Dept. G. 2215 Commerce St., Houston 2, Texas

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Manufactured by RECTOR WELL EQUIPMENT CO., INC. Fort Worth, Texas

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SECONDARY MODERN RECOVERY

TECHNICAL CONSULTING PRODUCTION ENGINEERING SERVICE, INCLUDING CORE ANALYSIS

PRESSURE MAINTENANCE WITH GAS OR WATER

REPRESSURING WITH GAS OR WATER

Bottom Hole Pressure Unit

On Location in Archer County, Texas

SURVEYS ESTIMATES DESIGN INSTALLATION SUPERVISION

PETROLEUM ENGINEERS CABLE & STINE WICHITA FALLS, TEXAS

Associations

Ten Papers on Oil Will Be Read at Annual AIME Meeting

The attention of the petroleum industry will be focused on St. Louis, February 17-22, when the American Institute of Mining and Metallurgical Engineers holds its annual meeting in the Statler Hotel.

The diversified program as arranged for members and guests of the Petroleum Branch, AIME, will have special emphasis placed on the Illinois Basin area. Ten papers will be presented in three sessions Tuesday and Wednesday, February 20 and 21. A water flooding session the afternoon of February 20 in the Statler Hotel will feature papers by H. S. Barger, consultant; C. V. Cameron, Shell Oil Company; and Richard W. Love, The Texas Company.

The morning of February 21 will see a drilling, logging and acidizing session with papers by George C. Howard and P. P. Scott, Jr., both of Stanolind Oil and Gas Company; H. G. Doll, Schlumberger Well Surveying Corporation; and P. H. Cardwell, Dowell Incorporated. During the afternoon, a reservoir and production engineering session will offer papers by P. L. Terwillinger, Howard N. Hall, L. E. Wilsey, P. M. Bridges and R. A. Morse, all of Stanolind; Irwin Politziner, F. M. Townsend and L. S. Reid, of the University of Oklahoma; E. J. Lyon and E. Van Dornick, Arabian American Oil Company; and William L. Horner, Sunray Oil Corporation.

In addition, a production review session will be held the morning of February 20 with D. V. Carter of Magnolia Petroleum Company and E. W. Berlin of Socony-Vacuum Company presiding. The session will hear reports from the various members of the AIME Production Review Committee who will outline the strides made by the petroleum industry in 1950. Reports will be made on all sections of the world.

At 6 p.m. February 20, the installation of Petroleum Branch, AIME, officers for 1951 will be conducted in the St. Louis Room of the Statler Hotel at the Branch's annual banquet. R. W. French of Sohio Oil Company will take over the reins as chairman from John E. Sherborne of Union Oil Company of California, 1950 chairman. In addition, Lincoln F. Elkins of Sohio, and Paul R. Turnbull of the La Gloria Corporation, will be installed as vice chairmen; and John S. Bell and Thomas C. Frick of Humble Oil & Refining Company and The Atlantic Refining Company, respectively, will be installed on the executive committee.

Southwestern API Production Division To Meet March 7-9

Progress since Spindletop will be the theme of the spring meeting of the Southwestern district, API Division of Production, which will be held March 7-9 at the Hotel Beaumont, Beaumont, Texas.

The first day, Wednesday, March 7, will be devoted to meetings of the district topical committees and study committees under the Central Committee on Drilling and Production Practice. A cocktail party and buffet supper, with petroleum equipment and service suppliers as hosts, is also planned for Wednesday.

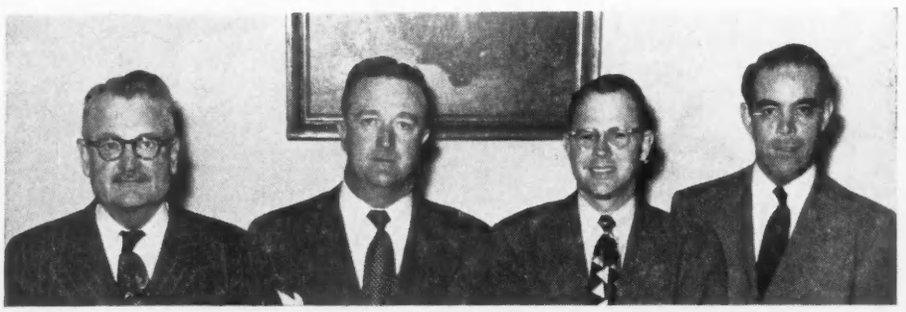
In addition to a technical session on Thursday, J. C. Donnell II, president of The Ohio Oil Company and API vice president for production, will address the meeting. The annual banquet is slated for Thursday evening.

Two technical sessions will highlight Friday's program.

Los Angeles Petroleum Club Elects Eckis as President

Rollin Eckis has been elected to succeed Henry Salvatori as president of the Petroleum Club of Los Angeles. Other officers are W. H. Geis, vice president; James G. Leovy, secretary; and Fero Williams, treasurer.

Three new directors were also elected. They are Geis, S. Z. Natcher, and R. M. Barnes.



Houston Chapter, API, has elected Sam Oliphant, Stanolind Oil and Gas Company second from right, chairman. Other officers shown are, left to right: Bill Duncan, Houston Oil Company of Texas, retiring chairman who becomes a member of the Advisory Board: H. F. Hopkins, Halliburton Oil Well Cementing Company, secretary-treasurer; Oliphant, and Charles Laas, Gulf Oil Corporation, first vice chairman. Leonard Swanson, Standard Oil Company of Texas, not shown, was elected second vice chairman. Those elected to the Advisory Board for two years are John R. Goodrich, Magnolia Petroleum Company; L. T. Tighe, The Texas Company; A. C. Golden, Pan American Production Company; Ralph Schultheis, Humble Oil & Refining Company; C. Marks Hinton, American Republics Corporation and W. O. Bartle, Brewster-Bartle Drilling Company.

FARMINGTON NEW MEXICO

A New Mid-Continent Store Address!!!

In the "Land of Enchantment" and in this new oil-active area—Mid-Continent has established a new outpost — The completely stocked Farmington branch. The equipment available is the best and the trained men handling it are experienced in supplying operators in New Mexico oil fields. With this new store location Mid-Continent again says — wherever there is oil — you'll find the blue neon derrick sign symbolizing service and supply.

DIVISION AND DISTRICT OFFICES

HOUSTON, TEXAS	KERMIT, TEXAS
MIDLAND, TEXAS	LOS ANGELES, CALIF.
NEW YORK CITY, N. Y.	NATCHEZ, MISS.
SHREVEPORT, LA.	NEW ORLEANS, LA.
TULSA, OKLAHOMA	OKLAHOMA CITY, OKLA.
*ARDMORE, OKLAHOMA	REFUGIO, TEXAS
*BRECKENRIDGE, TEXAS	*SAN ANGELO, TEXAS
CASPER, WYOMING	SAN ANTONIO, TEXAS
DALLAS, TEXAS	SNYDER, TEXAS
GREAT BEND, KANSAS	WICHITA FALLS, TEXAS
HOBBS, NEW MEXICO	WICHITA, KANSAS

(*Indicates Sales Office)

FIELD STORES

ABILENE, TEXAS	KERMIT, TEXAS
BROOKHAVEN, MISS.	KILGORE, TEXAS
BOWIE, TEXAS	LAKE CHARLES, LA.
CASPER, WYOMING	LAUREL, MISS.
DUNCAN, OKLAHOMA	MAGNOLIA, ARKANSAS
ELK CITY, OKLAHOMA	NATCHEZ, MISS.
EUNICE, NEW MEXICO	NEW IBERIA, LA.
FALFURRIAS, TEXAS	ODESSA, TEXAS
FARMINGTON, N. M.	OKLAHOMA CITY, OKLA.
FULLERTON, TEXAS	PAULS VALLEY, OKLA.
GAINESVILLE, TEXAS	PLAINVILLE, KANSAS
GREAT BEND, KANSAS	REFUGIO, TEXAS
HOBBS, NEW MEXICO	SHREVEPORT, LA.
HOUMA, LOUISIANA	SNYDER, TEXAS
HOUSTON, TEXAS	SUNDOWN, TEXAS
	WICHITA FALLS, TEXAS

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Around the CLOCK Around the WORLD SERVICE!!!

PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION MEMBER

THE WORLD'S LARGEST INDEPENDENT OIL FIELD SUPPLY COMPANY

Houston Chapter of Nomads was host recently to these foreign visitors, who are, left to right, W. O. Calvert, manufacturers representative, London, England; John W. Gunn, Tex-Pet, Colombia; Doc Skinner, Homco Service, Inc.; R. F. (Blondy) Roberts, Reed Roller Bit Company, Caracas, Venezuela; J. M. de la Garza, Pemex, Mexico City; and J. Ralph Coleman, CIMA, Mexico City.

"When you know and understand the problem, then you can get down to finding ways to lick it. We've been doing just that during 26 years of specialization in cathead manufacture. As a result we have a line of catheads that are first choice of the drilling industry.

"Heavy, well lubricated bearings, friction clutches and a crowder mechanism of special design mean these catheads are easy to operate — maximum power with minimum effort."

Foster Spinning Cathead

SPEED . . . instant engagement without reducing lineshaft speed.

ECONOMICAL . . . will spin and tong with forked line.

DEPENDABLE . . . heavy bearings, well lubricated . . . record of years of operation without repairs.

SAFETY . . . eliminates hand-wrapping of spinning line.

Foster Master, Type B, Breakout Cathead

SPEED . . . instant engagement without reducing lineshaft speed.

ECONOMICAL . . . no metal-to-metal impacts . . . no complicated brake necessary.

DEPENDABLE . . . powerful friction clutch . . . roller bearings.

FLEXIBLE . . . recommended for either air or manual controls.

• *In addition, the Foster Cathead Company manufactures the Air Master Breakout, Foster Air Spinning Cathead, plus the Foster Midget Master Breakout Cathead and Foster Midget Spinning Cathead for shallow drilling and clean-out rigs.*

Foster CATHEAD COMPANY
P. O. BOX 1675 WICHITA FALLS, TEXAS

FACTORY REPRESENTATIVES

O. W. Frogge, Casper, Wyoming
Tillery & Parks, Odessa, Texas
R. D. Cloninger, Lafayette, Louisiana

Houston Chapter of Nomads Elects Officers for 1951

The Houston Chapter of Nomads has elected Wayne Rives, The Oil and Gas Journal, president for the 1951 term. Other chapter officers are Herschel Wood, Lebanon Steel Foundry, vice president; E. F. (Salty) Baldwin, Hughes Tool Company, secretary-treasurer; Larry Kelley, Hillman-Kelley Company, assistant secretary-treasurer; Bob Franklin, Rolo Manufacturing Company, sergeant-at-arms; Jay Speece, Gardner-Denver Company, deputy sergeant-at-arms; Ed Lorehn, Cameron Iron Works, and Tracy Word, Well Equipment Manufacturing Company, reagents; and Harry Estes, A-1 Bit and Tool Company, executive secretary.

Petroleum Industries Group Re-elects Dorwin Chairman

Oscar John Dorwin, general counsel of The Texas Company, has been re-elected chairman of the American Petroleum Industries Committee for 1951. Dorwin has been chairman of the APIC since June, 1949, and a member of the committee since 1944.

Cyrus S. Gentry, vice president and general counsel of Shell Oil Company, was re-elected secretary of the APIC, a post he has held since 1941.

The committee also announced the reappointment of Baird H. Markham as director and named John H. Bivins, formerly assistant director, to the newly-created post of associate director.

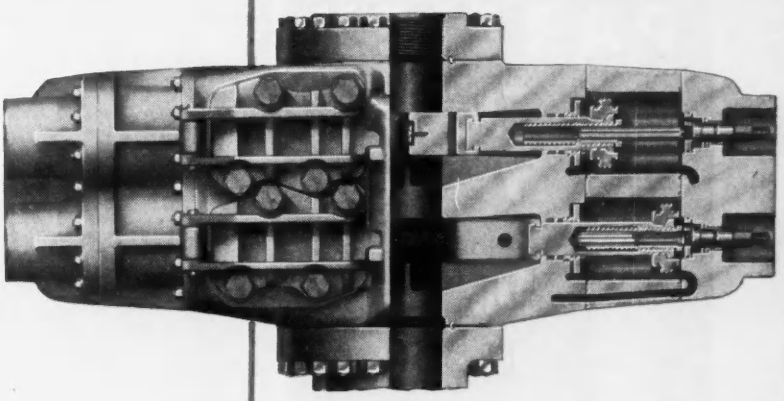
Other organizational changes in the committee's staff include Adam J. Rumoshosky as assistant to the director and Stephen P. Potter as manager of the Publicity section.

Tulsa Nomads Chapter Elects Amos Roberts 1951 President

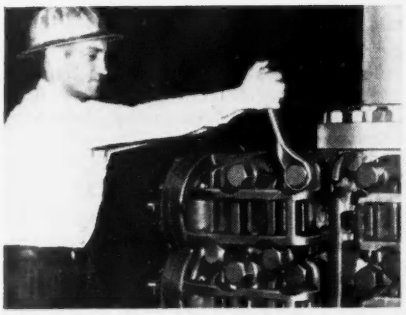
Amos A. Roberts, Baroid Sales division, National Lead Company, has been elected president for 1951 of the Tulsa Chapter, Nomads, succeeding G. W. Davidson, W. C. Norris Manufacturer, Inc. Other officers include Herbert M. Cooley, Bethlehem Steel Company, vice president; Gerald F. Coons, National Tube Company, secretary; Robert E. Kirberger, assistant secretary; Gilbert Swift, Well Surveys, Inc., treasurer; James S. George, Hughes Tool Company, assistant treasurer; Arch F. Campbell, General Motors Corporation, sergeant-at-arms; Robert C. Glover, Baker Oil Tools, Inc., deputy sergeant-at-arms; R. Opie Dimick, Century Geophysical Company, and Davidson, regents.

Only 4 easy steps to change rams

in the NEW SHAFFER HYDRAULIC CELLAR CONTROL GATES

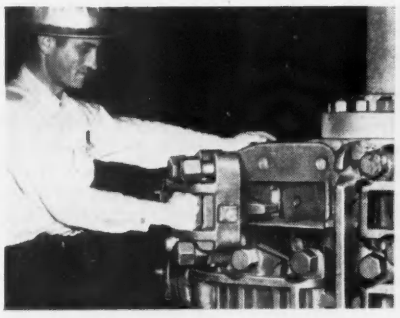


Note in this sectional view how two separate ram compartments are unitized into one compact body in the Shaffer Hydraulic Cellar Control Gate. Also note the steeply-sloped self-draining bottoms of the ram compartments . . . the direct hydraulic drive . . . and the completely enclosed design with no exterior operating parts to become jammed, damaged or corroded.



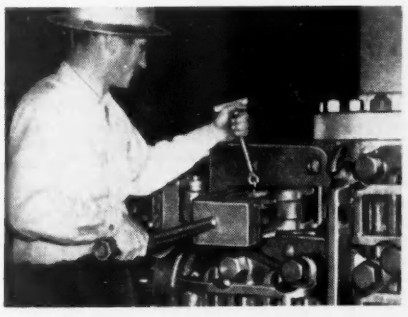
1 Unbolt two doors

in the side of the Gate. You don't even have to remove the bolts—they remain in the doors where they can't become lost.



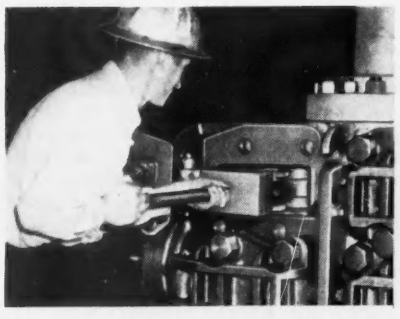
2 Swing the doors open

and pull out the ram assembly. There is nothing to loosen, unlock or disengage. The complete ram assembly slides right out.



3 Lift the rams

from the Gate and simply replace the ram blocks and rubbers with others of the desired size—a quick, simple operation.



4 Slide the ram assembly

back into the Gate, close and bolt the doors. Closing the doors automatically aligns the ram assemblies within the Gate.

With the Shaffer Hydraulic Cellar Control Gate you can make ram changes faster and simpler than in *any other* cellar control gate. And—equally important—you can make a complete ram change *whether the pipe is in or out of the hole!*

And remember this—unusual speed and simplicity of changing rams is only one of *many* vitally important advantages Shaffer engineers—pioneers in the development of high-pressure control equipment—have incorporated into Shaffer Hydraulic Cellar Control Gates. Check over the additional features outlined at right, and then get the *complete* story on these advanced Gates before you buy *any* cellar control gate equipment. No other equipment provides so much protection—in so small a space—with so many far-reaching advancements!

CHECK OVER THESE UNIQUE FEATURES, TOO!

- **UNUSUAL COMPACTNESS:** Although *two* separate ram compartments are unitized into *one* body, the overall height of the Gate, including both compartments, is only 30" in sizes as large as 13⅜" (12" Series 900). Smaller sizes are even more compact!
- **QUICK DRAINING BODY:** Note in sectional view above how the rams travel on high narrow guide ribs above the steeply-sloped bottoms of the ram compartments. Mud and sand quickly drain back into the well—no detrimental accumulations to interfere with free ram travel!
- **DIRECT HYDRAULIC DRIVE:** Also note in the view above how the hydraulic operating cylinders are directly *behind* the rams for positive action, maximum simplicity, greatest safety. There are no secondary connections between hydraulic cylinders and rams!
- **COMPLETELY ENCLOSED DESIGN:** All moving parts—even the piston rod ram shafts—are completely enclosed within the body of the Gate. There is nothing to become wedged or damaged by objects falling into the cellar—nothing to become corroded by chemical and mud drippings. Even the locking shaft is non-rising—fully protected!

And there are still other important features—all combining to make the Shaffer Hydraulic Cellar Control Gate the most advanced hydraulic gate available today. Get full details from your Shaffer representative—or write direct.

Write for your copy of the 1950 Shaffer Catalog that gives full information on Shaffer Hydraulic Cellar Control Gates and other Shaffer products.

See pages 4433 to 4496 of your 1950 Composite Catalog!

37 years OF OIL TOOL LEADERSHIP

SHAFFER

HIGH PRESSURE DRILLING AND CONTROL EQUIPMENT • FISHING TOOLS THAT EXCEL

SHAFFER TOOL WORKS, Brea, California • California Service Shops: Santa Fe Springs and Torrance
HOUSTON, TEXAS, 6006 Navigation Blvd. • ODESSA, TEXAS, 1925 West Second Street
OKLAHOMA CITY, OKLAHOMA, Acme Oil Tool Company, 1001 S. E. 29th Street
CASPER, WYOMING, Shaffer Tool Works, Post Office Box 1788
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PARELEX
Electric Heaters
for
Oil Wells
Bottom Hole Tubing and Flowline Heaters for Paraffin and Heavy Crude
Write for Details
Model BH3
PARELEX CORPORATION
2615 FANNIN STREET
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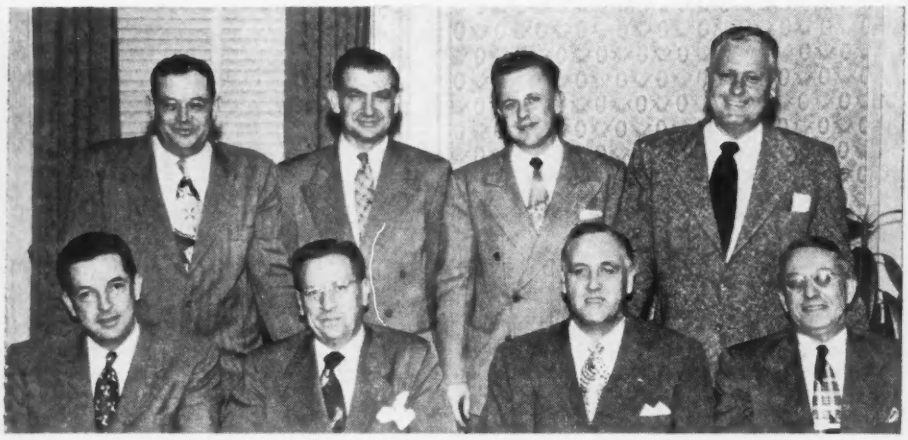
CONTACT YOUR FAVORITE SUPPLY HOUSE
PARMACO
PARKERSBURG MACHINE CO.
PARKERSBURG, W. VA. U.S.A.
The House of Courteous Service
50 YEARS OF SERVICE
And on our 50th Anniversary we again invite you to Standardize on
PARMACO PRODUCTS
PARKERSBURG MACHINE COMPANY
PARKERSBURG, W. VA.



Los Angeles Nomads officers for the 1951 term are, seated, left to right, John H. Flanagan, Lee J. Laird, J. A. Engstrand, and Earle M. Boggess. Standing are Vernon A. Mitchell, George W. Gutekunst, John W. Rife and James D. Hughes. Officers not pictured are Earl M. Rees, W. A. Wilson and W. H. Sargent.

Los Angeles Nomads Chapter Chooses Officers for 1951

Jerry Engstrand will head activities of the Los Angeles Chapter of Nomads as president during 1951. Other new officers are Earl Rees, vice president; Bill Wilson, secretary; John Flanagan, treasurer; Jim Hughes, sergeant-at-arms; George Gutekunst, assistant secretary; Vern Mitchell, assistant treasurer; Bill Sargent, assistant sergeant-at-arms; Lee J. Laird, senior regent; and Earle Boggess, junior regent.

The new officers will be installed at the Inaugural Ball February 17.

Permian Basin AAODC Elects Fred Bayless 1951 Chairman

Fred Bayless, Big Chief Drilling Company, Odessa, Texas, was elected chairman of the Permian Basin Chapter of AAODC. He succeeds H. W. Davidson, Davidson Drilling Company, Odessa, who was elected vice president for West Texas and New Mexico at the Tenth Annual Meeting in Tulsa last October.

Other chapter officers elected for the coming year include Robert C. Schmidt, Loffland Brothers, Inc., Midland, vice chairman, and Fred J. Agee, J. F. Postelle, Odessa, secretary.

Service Company President Heads Pipe Line Committee

J. L. Burke, Tulsa, president of Service Pipe Line Company, was elected chairman for 1951 of the Committee for Pipe Line Companies, succeeding William C. Kinsolving, Philadelphia, president of Sun Pipe Line Company. Ralph B. McLaughlin, Houston, president of The Texas Pipe Line Company, was elected vice chairman, succeeding Burke.

Central Oklahoma API Elects

Central Oklahoma Production Chapter, American Petroleum Institute, Oklahoma City, elected the following new officers for 1951: Fred Griswold, independent, chairman; Elmer Rubac, American Iron and Machine Works, vice chairman; S. W. Hamner, Sohio Petroleum Company, secretary-treasurer; R. W. Warkentin, Lane-Wells Company, and Bert Hixon, Anderson-Prichard Oil Corporation, program chairmen; Charles Hoffman, Cities Service Gas Company, publicity chairman; Ray Hall, Bovaird Supply Company, membership chairman.

Robinson Heads Oil Scouts

Max A. Robinson, Superior Oil Company, has been elected president of the North Texas Oil Scouts Association. Other officers include Douglas N. Moody, Sinclair Oil and Gas Company, and Bert L. Stovall, The Pure Oil Company, vice presidents; Fred W. Jaedicke, Magnolia Petroleum Company, secretary-treasurer; Bert R. Coleman, Jr., Phillips Petroleum Company, editor of the yearbook.

Kansas Geologists Elect Ruwwe

New officers of the Kansas Geological Society, Wichita, are Ralph W. Ruwwe, Stanolind Oil and Gas Company, president, succeeding Frank Brooks, El Dorado Refining Company; Gerald Kathol, consultant, vice president; Richard A. Shelly, Bay Petroleum Corporation, secretary-treasurer; W. G. Iverson, Continental Oil Company, director.

Annual Dinner Scheduled

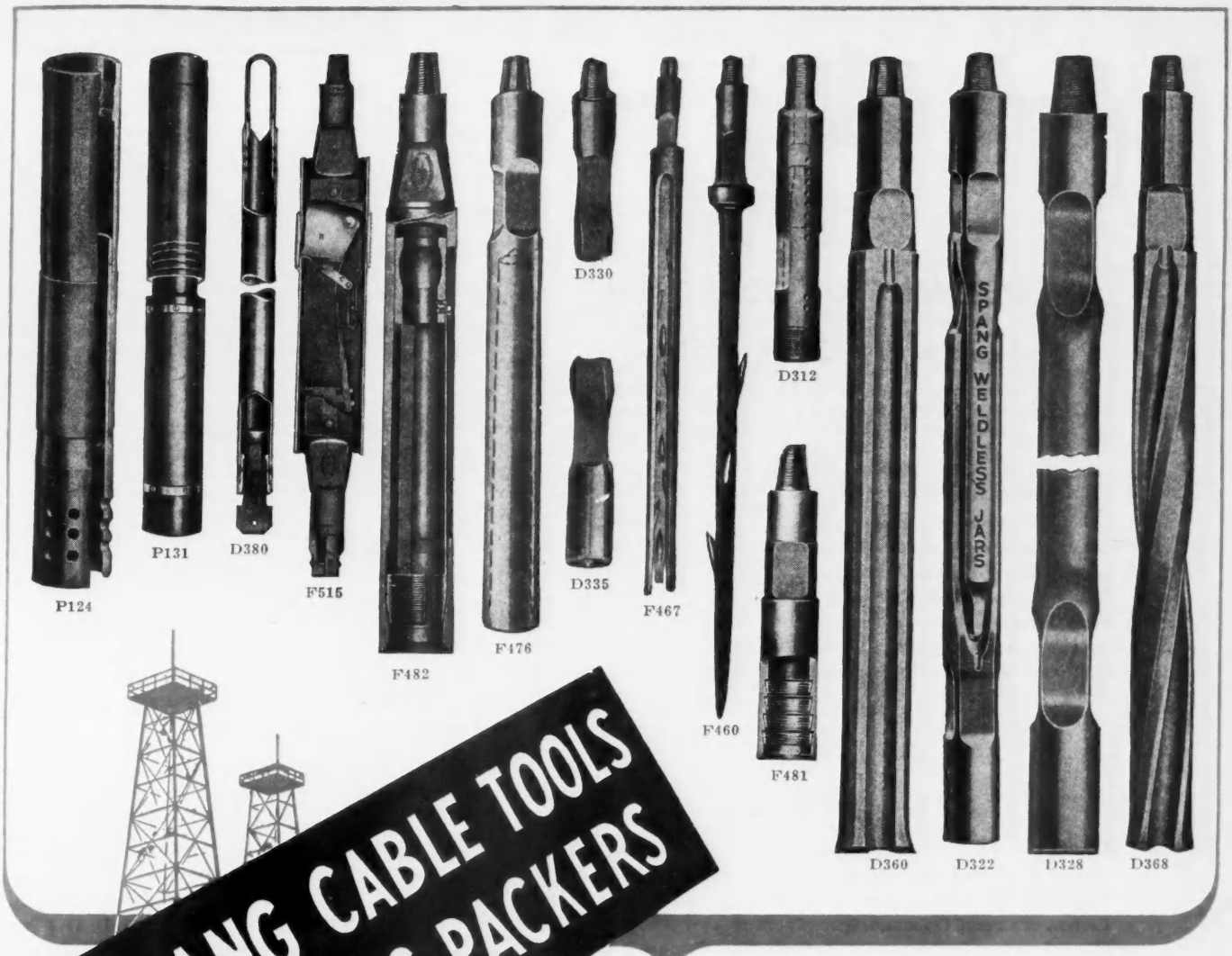
The Annual Dinner Meeting of the San Joaquin Valley Oil Producers Association will be held at the Bakersfield Inn, Bakersfield, Calif., February 28, 1951. Guest speaker for the evening will be Bruce K. Brown, Deputy Petroleum Administrator for Defense.

Permian Basin Scouts Elect

R. L. Denton, Magnolia Petroleum Company, has been elected president of the Permian Basin Crude Oil Scouts Association. Other officers are Sid Binion, The Atlantic Refining Company, vice president; Bob Roehl, Cities Service Oil Company, secretary-editor; and L. B. Berry, Shell Oil Company, treasurer.

Kansas AAODC Names Adkins

Jim Adkins, Great Bend, Kansas, has been elected chairman of the Kansas Chapter AAODC, succeeding C. H. Todd, Rine Drilling Company. J. D. Ferrell, Wichita, Kansas, was named secretary.



SPANG CABLE TOOLS and SPANG PACKERS

aid modern drilling in All Fields

Spang Cable Tools and Spang Packers have been developed in the belief that the best equipment and the best maintenance result in the most economical drilling. Spang Tools, built for rugged service, are known and preferred the world over. They are available through leading supply companies and field shops everywhere.

Your Favorite Supply Dealer recommends and sells

SPANG CABLE TOOLS

D312—Swivel Rope Socket
D322—Weldless Jar
D328—Drilling Stem
D330—Stem Pin
D335—Stem Box
D366—Straight Drilling Bit
D368—Twisted Drilling Bit
D380—Regular Bailer
F460—Center Rope Spear
F467—Three-Prong Grab
F476—Solid Bored Friction Socket
F481—Multi-Slip Collar Socket
F482—Full-Circle 3-Slip Slip Socket
F515—Reversible Casing Ripper
P124—Deep-Hole Special Bottom-Hole Packer
P131—Screw-Release Casing-Anchor Packer

THE HIGHER STANDARD

SPANG & CO.
BUTLER, PA.

The Higher Standard

1895 1st of Tulsa 1951

STATEMENT OF CONDITION

December 30th, 1950

RESOURCES

Cash and Due from Banks	$72,276,986.79	
U. S. Government Securities	59,507,444.44	$131,784,431.23
Other Bonds and Securities		9,652,742.55
Loans and Discounts		68,012,551.48
Federal Reserve Bank Stock		240,000.00
Income Earned, Not Collected		512,408.67
Bank Premises		1.00
Furniture and Fixtures		736,147.30
Customers' Liability Under Letters of Credit		13,030,026.58
Other Resources		20,376.71
		$223,988,685.52

LIABILITIES

Deposits		$199,232,557.23
Income Collected, Not Earned		322,222.47
Taxes Interest and Expense—Accrued		584,397.95
Letters of Credit Outstanding		13,030,026.58
Capital	$ 3,000,000.00	
Surplus	5,000,000.00	
Undivided Profits	2,819,481.29	10,819,481.29
		$223,988,685.52

DIRECTORS

J. P. BYRD, JR.
Vice President

F. L. DUNN
Executive Vice President

A. L. FARMER
Real Estate

RUSH GREENSLADE
Investments

ELMER HALE
President, Hale-Halsell Company

R. K. LANE
President, Public Service Company of Oklahoma

JOHN E. MABEE
Investments

JOHN D. MAYO
President, Mayo Hotel Co. and Mayos', Inc.

FRANK G. McCLINTOCK
Vice President, Zephyr Petroleum Company

R. OTIS McCLINTOCK
President

E. H. McCOLLOUGH
Vice President, Amerada Petroleum Corporation

F. B. PARRIOTT
Chairman, Sunray Oil Corporation

FRANK O. PRIOR
Vice President, Standard Oil Company (Indiana)

J. L. SHAKELY
President, Jones & Laughlin Supply Company

W. G. SKELLY
President, Skelly Oil Company

R. ELMO THOMPSON
Vice President

GARY Y. VANDEVER
President, Vandever Dry Goods Company

JAY P. WALKER
President, National Tank Company

W. K. WARREN
President, Warren Petroleum Corporation

JOHN M. WINTERS, JR.
Conner, Winters, Lee and Randolph

THE FIRST NATIONAL BANK AND TRUST COMPANY OF TULSA

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

Companies in the News

STANOLIND OIL AND GAS COMPANY is planning to construct a multi-million dollar petroleum research center in Tulsa. The center will house the more than 350 Stanolind research personnel, including chemists, physicists, seismologists, geologists and engineers, as well as a large non-technical staff. **George Roberts, Jr.,** is manager of the Research department. Exploration research is under the supervision of **Dr. Daniel Silverman. Lloyd E. Elkins** is in charge of oil and gas production research and **Scott Walker** directs the chemical research. **Dr. Paul F. Hawley** is in charge of patent work.

•

EDISON OIL COMPANY and Wilmington Associates, Inc., have purchased control of the Jergins Oil Company, independent producer of gas and oil on the West Coast. Principal Jergins producing properties are in the Edison, Wilmington and Signal Hill fields in California, with gas reserves in the Rio Vista field, and an interest in the San Ardo field.

•

WARREN OIL COMPANY has transferred its North Central Division to Abilene, Texas, from Wichita Falls.

•

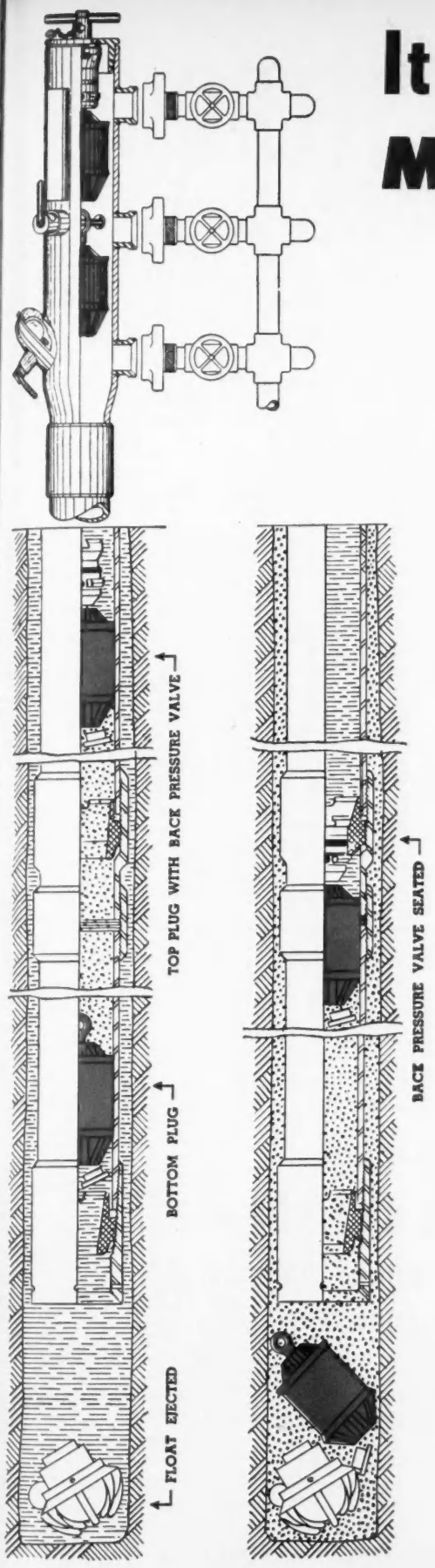
LION OIL COMPANY, El Dorado, Arkansas, has formed a Natural Gas department within its Oil Production division with **William M. Wilson,** formerly assistant superintendent of the Refining division, as superintendent.

•

CONTINENTAL OIL COMPANY has completed plans for awarding ten scholarships each year to sons and daughters of employes, and the first awards will be made for the fall term of 1951. The plan, conceived last year in observance of Continental's 75th Anniversary, provides that scholarships of $500 each will be awarded each year on a competitive basis to applicants chosen by the selection committee.

Members of the selection committee for Continental Oil Company scholarships, shown with Continental President L. F. McCollum, standing at left, are, at right, standing, Dr. George H. Cross, president of the University of Oklahoma, Norman; and seated, left to right, Dr. William V. Houston, president of The Rice Institute, Houston; Mrs. Oveta Culp Hobby, executive vice president, The Houston Post; and Dr. John W. Vanderwilt, president of the Colorado School of Mines, Golden.

It takes all 7 to get a MASTER CEMENTING JOB!



1. Uncontaminated Cement Delivered at Casing Shoe

With the Rector Fulbore Method, cement is entrapped between two collapsible plugs, which swab and clean the casing as they travel down. When properly conditioned mud has been pumped into the well, the bottom plug is released and cement started into the well. When the proper amount of cement has been pumped in, the top plug, with back pressure valve, is released and travels down with the cement.

2. Uniform Body of Cement at Shoe Minimizes Hazard of Channeling

You can be sure the cement placed behind the casing by the Rector Fulbore Method has the same uniform body throughout. There are no soft spots or pockets where trouble can develop at a later date.

3. Full Casing Discharge Capacity at Lower Pressure

With the Rector Fulbore Method the float assembly is ejected from the shoe when it has floated the casing string into position. This unrestricted opening reduces the load on the pumps . . . permits circulation of greater volume with same discharge pressure . . . produces higher velocity in space between casing and bottom of hole.

4. Positive Prevention of Back Flow

The back pressure valve with collapsible plug securely locks in the stall collar to positively prevent the back flow of cement in the casing beyond the point at which the operator has elected to place the stall collar. Operator has positive control over amount of cement left in casing.

5. Closed Circuit Cement Head Prevents Entrainment of Air in Column

The Rector Cementing Head is completely loaded before being put on the casing string. It is never opened from beginning to completion of cementing. Trip ball and the two plugs are released by mechanical means from outside the head. It is impossible for air pockets to form in either the mud or cement column.

6. Multiple Inlets on Cement Head for Greater Volume

Rector Fulbore Cementing Heads provide for use of one to five cementing hoses. This enables the operator to pump cement in at a greatly increased volume to save time and maintain the quality of the cement.

7. Cement Placed in Annulus Back of Casing in Minimum of Time

The greater inlet volume of the head combined with full casing discharge saves considerable time in getting the uniform quality cement pumped into the annulus behind the casing.

ONLY THE RECTOR FULBORE CEMENTING METHOD
HAS ALL SEVEN OF THESE VITAL FEATURES . . .
THAT'S WHY IT IS THE ONLY METHOD THAT GIVES
YOU A MASTER CEMENTING JOB . . . EVERYTIME.

Ask your Rector Representative or Supply Man for facts and details . . . or write for bulletins.

RECTOR WELL EQUIPMENT CO., INC.
FORT WORTH, TEXAS

Ft. Worth Plant, 1100 N. Commerce St. Houston Plant, 2215 Commerce St.

REPRESENTATIVES IN ALL ACTIVE FIELDS

RECTOR FULBORE CEMENTING METHOD

ASK YOUR SUPPLY STORE FOR RECTOR "FULBORE" CEMENTING EQUIPMENT

EQUIPMENT AND SERVICE SUPPLIERS' NOTES

Ken W. Davis Purchases All Stock Of Unit Rig and Equipment Company

Ken W. Davis, Fort Worth, has acquired all the stock of Unit Rig and Equipment Company, Tulsa, one of the largest designers and manufacturers of oil field equipment and ditching machines in the country. Included in the deal is the property of the Rounds and Porter Lumber Company, recently acquired by Unit Rig. This property will be improved with construction of plant facilities to help meet the greatly increased demand for Unit Rig products. No personnel changes are contemplated, according to the announcement.

Martin-Decker Field Men Study New Weight Indicator at Factory

In preparation for marketing Martin-Decker Corporation's new Type "F" Weight Indicator and The National Supply Company's Ideal Wire Line Anchor, several Martin-Decker field engineers recently visited the Martin-Decker plant at Long Beach. Attending the intensive instruction course were Martin-Decker factory representatives, Jack Clemens of the Gulf Coast, "Mutt" Donovan of the Mid-Continent and Carroll Kelso of West Texas. Another Martin-Decker man who visited the plant to study the Type "F" was Sandy Sandhoff, special company representative who is currently touring the oil country showing a Martin-Decker movie.

Black, Sivalls & Bryson Appoints Ruysser as General Sales Manager

Henry A. Ruysser, Jr., vice president, has been appointed general manager of sales for Black, Sivalls & Bryson, Inc. Ruysser has been an officer and director of the corporation for the past five years. A graduate in chemical engineering of the University of Detroit, Ruysser was with Ford Motor Company before World War II, when he joined the Corps of Engineers to administer procurement of all military supplies in six Mid-western states. As general sales manager, he is responsible for domestic and foreign BS&B sales, and for advertising and sales promotion.

Henry A. Ruysser, Jr.

Schlumberger Moves New Mexico Man To Edmonton as District Manager

R. C. Davis, former manager of the Hobbs, N. M., district office of Schlumberger Well Surveying Corporation, has been transferred to Edmonton, Alberta, Canada, to be placed in charge of that district.

C. W. Trainer, assistant district manager at Snyder, Texas, replaces Davis as district manager in the Hobbs office.

Cooper-Bessemer Holds School

The Cooper-Bessemer Corporation was recently host to a technical conference between eastern educators and diesel engineers at its Grove City, Penn., plant. The purpose of the meeting was to impart first hand, the latest information on new diesel developments for more comprehensive instruction on the principles of diesel operation in engineering and technical schools.

Buda Moves Bakersfield Quarters

Buda Engine and Equipment Company, Inc., has moved its Bakersfield, Calif., quarters to 25 Union Avenue, U. S. Highway 99. Don L. Chumbley is district manager.

SUNOCO

SUN OIL COMPANY

an entirely independent unit of the petroleum industry

•

Manufacturers of

BLUE SUNOCO GASOLINE
SUNOCO MOTOR OIL
SUN INDUSTRIAL PRODUCTS

and a

COMPLETE LINE OF BLENDING OILS, FINISHED OILS AND GREASES

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SUN OIL COMPANY
Philadelphia, Pa.

Texas Sales Offices:
DALLAS and BEAUMONT

Modern methods, backed by years
of experience, make TESCO
your most dependable source
of steel castings.
TEXAS ELECTRIC STEEL CASTING CO.
GOOD CASTINGS
TESCO
HOUSTON, TEXAS

BARRET

SPECIALIZING IN MAGNETIC SURVEYS

Contracts accepted for domestic and foreign projects, using the most improved instrumental and interpretative technique.

William M. Barret, Inc.

Consulting Geophysicists

GIDDENS-LANE BUILDING
SHREVEPORT, LOUISIANA

Red Top (Hydrostatic) BAILER

A QUICK, POSITIVE LOAD REGARDLESS OF FLUID LEVEL.
Ideal also for fishing small objects—widely used for drilling in (completing) wells, and for drilling cement or plastic plug overages.

REYNOLDS SPECIALTY COMPANY, INC.

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Office: 804 Erie St., Phone 7-7511
If no answer call 2-2023, 7-4966, or 2-5842
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Louisiana:
HOUMA, Sam Hattaway, phone 6263 & 6731.
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SHREVEPORT, Phone 7-7511

Arkansas:
EL DORADO, Cox Supply Co.

Oklahoma Service:
OKLAHOMA CITY, Dawson Service Co., Phone 54-7577

Texas:
CORPUS CHRISTI, A. S. Baylor, Phone 2-2461.
BORGER, Nichols Tool Company, phone 350.
KILGORE, Spain Brothers, phone 2981.
SERVICE, phone 3, Turnertown; 2981, Kilgore;
TALCO, Talco Lumber Co.
SEMINOLE, A. C. Simmons, phone 404-J.

Standco NO-SMOKE

STANDCO BRAKE LINING

Is the driller's best friend because it makes the easiest brake known and "feeds off evenly while drilling." It never scores brake rims. See pages 3608-3613, Composite Catalog.

Standco Brake Lining Co.
HOUSTON

HOUSTON LABORATORIES

Analytical and Consulting Chemists

Hydrocarbon Gas Analyses, Reservoir Equilibria Studies for Crude and Condensate well, Waters, Brines, Corrosion and Industrial Analyses.

Phone CApitol 1319, Box 132, Houston, Texas

EQUIPMENT and SERVICE SUPPLIERS' NOTES

A distributorship Agreement has been completed by Russ J. Carlson, left, president of Mud Control Laboratories, Inc., and William E. Stiles, division manager of Ken Corporation.

Mud Control Labs Will Distribute Ken Corporation Drilling Fluid

Russ J. Carlson, president of Mud Control Laboratories, Inc., Oklahoma City and William E. Stiles, division manager for Ken Corporation, announced the completion of a distributor agreement making Mud Control distributors of "Ken-Oil," oil base drilling fluid.

Ken-Oil, a development of the Union Oil Company of California, has been employer as a drilling and completion fluid in California, Venezuela and the Far East during the past several years.

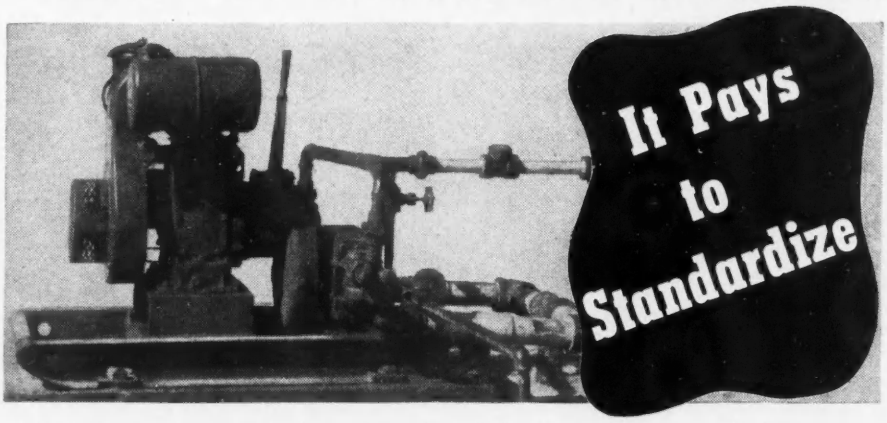
Stiles, formerly sales manager for Core Laboratories, Inc., has established manufacturing and sales headquarters for Ken Corporation in Dallas.

Distribution and servicing of Ken-Oil will be handled by Mud Control Laboratories, Inc., in Oklahoma, North Texas, West Texas and Rocky Mountian areas.

Jas. P. Marsh Builds Addition

Jas. P. Marsh Corporation has constructed a 17,000 square foot addition to its manufacturing plant at Skokie, Ill. The new plant was put in operation the first of the year.

PUMPS or WISCONSIN ENGINES



This husky Wisconsin-powered pumping unit, built by Harley Sales Co., is used to pump salt water, crude oil, distillate, gasoline, and many chemicals. It discharges at rates up to 3000 lbs., pumps up to five barrels an hour, and similar models can be built of various types of metals.

When it comes to power, many users are STANDARDIZING on Wisconsin Heavy-Duty Air-Cooled Engines. Being extremely compact, these engines mount easily on almost every type of machine. Overall weight is reduced, fewer costly gears are needed. Dependable air-cooling eliminates all climatic trouble-hazards. Rotary-type outside magneto with impulse coupling assures quick, easy, any-weather starting, at lower cranking speed, plus dependable operating ignition.

Wisconsin Air-Cooled Engines are supplied in 4-cycle, single-cylinder, 2-cylinder, and V-type 4-cylinder models, 3 to 30 hp.

WISCONSIN MOTOR Corporation
MILWAUKEE 46, WISCONSIN
World's Largest Builders of Heavy-Duty Air-Cooled Engines

WRITE TO HARLEY SALES CO.
510 ATLAS BUILDING, TULSA, OKLAHOMA
M & M BUILDING, HOUSTON, TEXAS
505 SOUTH MAIN ST., WICHITA, KANSAS
OIL FIELD DISTRIBUTORS FOR WISCONSIN ENGINES AND ALL TYPES OF UTILITY UNITS.

Emblem Of Leadership

There's no substitute for experience—or for quality. Drillers with a life-time of experience select as their *first choice* Thermoid Powerflex Rotary Hose for safety, dependability, and economy.

Powerflex Rotary Hose is tested to 5000 psi before shipment—a test far more severe than the most grueling field operations . . . Tube is synthetic rubber, oil and abrasion resistant —reinforced with steel cables and prestretched fabric . . . Cover resists aging, abrasion, cracking . . . Couplings are built-in and anchored securely for life of hose.

Thermoid Powerflex Rotary Hose is an achievement in *advanced* hose engineering . . . it is a typical example of the high quality which has made all Thermoid Oil Field Products leaders in the oil fields.

Midcontinent office and warehouse: Houston, Texas

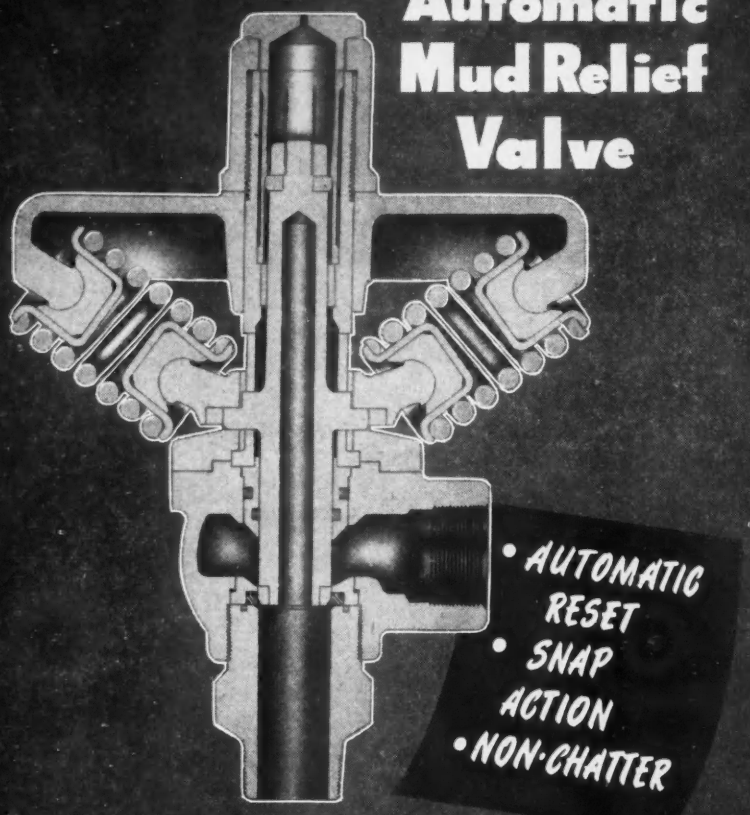
Thermoid

Powerflex Rotary Hose • Trioflex Slim-Hole Rotary Hose • Mud-Flo Slush Pump Hose • Flexible Discharge Units • F.H.P. and Multiple V-Belts • Oil Country Flat Belting

Wire Line Turn Backs • No-Wip Line Savers • Stuffing Box Rings • All Types of Hose • Molded Specialties • Brake Blocks

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah

KINZBACH
Automatic Mud Relief Valve



AT last positive automatic relief of overload pressures in mud lines is possible. The new Kinzbach Model 112 Relief Valve provides safer, more efficient pump or pressure relief and greater flexibility in operations than any other valve.

The Model 112 operates on working pressures from 750 to 2500 p.s.i. It Snaps Open for instantaneous pressure relief at maximum volume. It Snaps Shut to restore circulation instantly and automatically after a pre-determined pressure drop.

The Model 112 Valve can be used for any mud relief application, including compounding operations. Field tests prove conclusively that the Kinzbach Valve offers every operational advantage required for efficient mud operations. Write for full technical data. Ask for bulletin 11250.

KINZBACH TOOL CO., INC.
P. O. Box 277 • Houston 1, Texas

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New York, N. Y.

EQUIPMENT and SERVICE SUPPLIERS' NOTES

Pioneer Gas Lift Firm to Operate In Texas and Louisiana Gulf Areas

Ben L. Jones

Doyle Johnston

Formation of Pioneer Gas Lift Company, 424 Hogan Street, Houston, was announced by Ben L. Jones, president and owner of the firm. Doyle Johnston is the sales manager. Pioneer manufactures and sells pressure-operated gas lift valves, and, at present, has its product available in the Texas and Louisiana Gulf Coast areas.

Both Jones and Johnston have been actively engaged in the gas lift business for many years. Johnston was formerly with Camco, Inc., and H. P. Gott Manufacturing Company.

Moore Joins Ruse as Partner In California Diamond Drilling Firm

J. Arthur Moore has joined Ralph Ruse as a partner in the Diamond Drilling Company, with offices in Compton, Calif. For the past year and a half, Ruse has represented Drilling and Service Company of Dallas, on the West Coast, handling Truco diamond bits and D & S core barrels. Moore was one of the founders of Oil Base, Inc., and served as vice president in charge of sales for that company for five years.

Art Moore

Also with the new company in sales and service capacities are Don Leidecker, Jack Flanakin, Bill Evdokimoff, Whitey Fuller and Van Keenan.

Worthington Buys Oil City Plant

Worthington Pump and Machinery Corporation, Harrison, N. J., has acquired the land, buildings, and equipment of National Transit Pump and Machine Company in Oil City, Penn. This plant, covering about 500,000 square feet, will be utilized by Worthington in furtherance of its production of equipment related to the National Defense Program.

Field Service Branch Is Opened

Franks Manufacturing Company, Tulsa, has opened a field service branch in Seminole, with Albert E. Hastings, manager. Stuart Corry, district sales manager for Franks in Oklahoma, will be in charge of the sales division. Besides servicing its equipment the new branch will be completely stocked with parts to cover maintenance and repairs of Franks Units.

EQUIPMENT and SERVICE SUPPLIERS' NOTES

Rockwell Manufacturing Acquires Two Valve and Fittings Concerns

Rockwell Manufacturing Company announced the acquisition of both the Pittsburgh Valve and Fittings division of the Pitcairn Corporation, and the Pittsburgh Valve and Fittings Corporation, a subsidiary of the Pitcairn Corporation.

Manufacturing facilities and principal offices of Pittsburgh Valve are in Barberton, Ohio. Company-owned warehouses were also acquired in Kansas City and Houston. Leased warehouses are maintained in Chicago and New York. The plant is located on a 38-acre tract and embraces a total of 400,000 square feet of floor area. Included with the plant facilities is a foundry for the manufacture of valve castings.

R. G. Caouette, at present general manager in charge of manufacturing for the Meter and Valve division of Rockwell will become general manager of the Barberton property. J. A. Strachan, general manager of sales of Pittsburgh Valve will continue in that capacity as will all district managers and a sales staff of 25 people. Strachan was previously with Kerotest of Pittsburgh for 14 years and with the Weatherhead Company, Cleveland, for eight years.

Former Jersey Standard Executive Is Elected to Worthington Board

Robert T. Haslam has been elected to the board of directors of Worthington Pump and Machinery Corporation, Harrison, N. J.

R. T. Haslam

Haslam was, until recently, a vice president and director of Standard Oil Company (N.J.) A director and member of the executive committee of Ethyl Corporation, he also is a member of the Corporation of Massachusetts Institute of Technology.

Wickwire Spencer Appoints Watts Assistant General Sales Manager

L. A. Watts has been named assistant general sales manager of the Wickwire Spencer Steel division of The Colorado Fuel and Iron Corporation. Watts, a graduate of Northwestern University, joined the then Wickwire Spencer Steel Company in 1938. His most recent post was manager of the Pig Iron and Semi-Finished Sales department and sales manager of the Wire Products department.

L. A. Watts

Robert M. Wagner succeeds Watts as sales manager of the Wire Products department. He has been with the company continuously since 1931, except for four years' service in the Armed Forces during the war. He was most recently assistant wire sales manager.

Only genuine RIDGID guarantees economy

This Work-Saver RIDGID assures you . . . "No pipe wrench housing repair expense."

• You'll find no substitute for the smart-working long-lasting qualities that have made the RIDGID the world's most popular pipe wrench. Breakproof housing, full-floating hookjaw with handy pipe scale, replaceable heeljaw, adjusting nut that spins easily in all sizes, 6" to 60", comfort-grip handle —these plus the RIDGID name mean more service and tool satisfaction for your money. Buy at your Supply House.

RIDGID

★ Work-Saver Pipe Tools ★

THE RIDGE TOOL CO. • ELYRIA, OHIO

Lone Star Steel Will Construct Additional East Texas Facilities

Work has been started on construction of an integrated steel mill and pipe finishing plant adjacent to Lone Star Steel Company's present blast furnace, coke ovens and related facilities in East Texas. A tight-knit operation, Lone Star's iron ore is mined within sight of the blast furnace, and coal is produced in company mines only 200 miles from the plant site. Consumption of a major portion of the production is expected to occur within a radius of 300 miles of the plant. Government loans of $73,425,201 have been granted for the new plant.

Stewart & Stevenson Men to Detroit

Five members of the Stewart & Stevenson Services, Inc., sales organization attended a meeting at the Chrysler Corporation in Detroit, and later toured the General Motors Diesel Engine factory at Detroit. The men are Ray Loden, Houston; Emmett Dobbs, Houston; N. N. Elkins, Corpus Christi; J. C. Brown, McAllen; Carsey Manning, Longview, and A. B. Grant, Beaumont.

Oil Well Supply Company Advances Two to Key Engineering Positions

Oil Well Supply Company has appointed M. F. Hazel as director of engineering and Alex Quayle as chief engineer in charge of all product design. Hazel has been "Oilwell's" general manager of sales since January 1, 1948. Quayle was chief engineer in charge of product design at Imperial Works,

M. F. Hazel

Alex Quayle

Oil City, Penn., the company's principal manufacturing plant. In his new position he will be at the home offices in Dallas.

Oil Well Supply Company has established headquarters of its Southeast Texas district at Lake Charles, La., and has appointed A. D. Butler manager. Butler succeeds F. W. Little, who has been transferred to the Central Midwest division with headquarters at Dallas, as assistant to V. J. Waters, division manager.

Lawrence D. Kinnan has been named district merchandise manager of the Southeast Texas district, with headquarters at the Houston branch store.

Melvin Dixon, district manager of Oil Well Supply Company's Illinois district, has been named manager of the West Texas district and transferred to Midland, Texas. He succeeds T. E. Bowers, who has been named district merchandise manager in West Texas. Dixon is succeeded in Illinois by J. P. O'Toole, formerly assistant manager of the West Texas district. R. M. Sherrard is merchandise manager in Illinois.

J. D. Plumer, formerly representative at Pikeville, Ky., has been appointed manager of "Oilwell's" branch store at Washington, Penn.

Byron Jackson Promotes Engineer To Tulsa District Sales Position

Dean DeGraffenreid has been appointed district sales engineer for the Tulsa office of Byron Jackson Company.

DeGraffenreid joined Byron Jackson Company in 1947, as test engineer for the Pump division. In March 1948, he transferred to the Sales department of the Pump division and was assigned to the Los Angeles branch office, his work being primarily in the oil industry of Southern California. In May, 1950, he was assigned to the division office in Tulsa.

D. DeGraffenreid

RED DEVIL

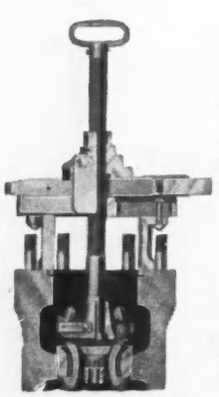
SLUSH PUMP VALVES

For high pressure abrasive service

In the manufacture of Red Devil Valves, particular emphasis has been given to HIGH PRESSURE ABRASIVE SERVICE at lowest possible operating costs. Their design is unique in simplicity, having only 5 parts. Valve and Seat are drop forged for maximum strength and processed for a deep high-carbon case to withstand excessive abrasive action. Seat has the least possible flow restriction and flat surface on bottom provides easy removal with Valve Seat Puller. "DIA-TEX" Inserts are Oil and Heat Resistant and can be reversed when worn on one side to double their long service life.

Write for Catalog No. P-110.

SPRING LOCK WASHER | VALVE INSERT PLATE | REVERSIBLE "DIA-TEX" VALVE INSERT | VALVE | VALVE SEAT



RED DEVIL VALVE SEAT PULLER

Provides a fast and positive means for pulling badly stuck valve seats by gripping the bottom rim of the seat. Eliminates the expense and hazards of removing seats with a cutting torch. All parts are made of highest grade alloy steel. Write for Catalog No. P-111.

CONSULT YOUR COMPOSITE. For full information on Red Devil Valves, Pullers and other Products, see Composite Catalog or write for price catalogs noted above. Red Devil Products are available through your supply store.

OIL WELL MANUFACTURING CORP.

6008 S. Alameda St., Los Angeles 1, Calif.

Clayton Joins Century Company As Supervisor of Geophysical Parties

Neal Clayton has joined Century Geophysical Company as geophysical supervisor, and will be directly associated with the supervision of field parties.

Neal Clayton

He received his A.B. degree in physics from Mississippi College in 1934, and in 1937 took his M.S. at Louisiana State University. He began work on a seismic crew for Humble Oil & Refining Company in the summer of 1936 and, after graduation, worked on seismic crews in the U. S. and in Eastern Venezuela. Later he was employed as computer, observer, and party chief by Seismic Explorations, Inc., the Magnolia Petroleum Company, and the North American Geophysical Company. From 1941 to 1943 he was an associate physicist with the Naval Ordnance Laboratory in Washington, D. C. Clayton joined Republic Exploration Company in February, 1946, as supervisor of surface shooting.

Lunkenheimer Firm Vice President Is Named Secretary of Company

Edmund P. Lunken, vice president of The Lunkenheimer Company, has also been elected secretary. Lunken succeeds Charles W. Burrage, now manager of sales engineering, who resigned to devote full time to sales. A graduate of Yale University, Lunken has been associated with The Lunkenheimer Company since 1936. He worked two years in various jobs in the factory, later, as sales representative, and vice president since 1945.

Edmund P. Lunken

Two Bethlehem Steel Subsidiaries Integrate Oil Field Operations

Bethlehem Steel Company has announced that Bethlehem Supply Company of California is now operating as an integral unit of Bethlehem Supply Company, whose headquarters are in Tulsa. Thus the operations of Bethlehem's oil field supply activities are combined under one management. Bethlehem entered the oil field supply business in 1937, and its organization now includes 50 field stores and two manufacturing plants.

Mack Trucks Elects A. R. Kelso As Production Vice President

A. R. Kelso has been elected vice president of Mack Trucks, Inc., and a vice president and director of Mack Manufacturing Corporation, the parent company's wholly-owned manufacturing subsidiary.

Kelso will be in charge of manufacturing and production at all Mack plants, with headquarters at Allentown, Penn., site of the main assembly plant.

Kelso joined the company early this year as production counsellor.

Engine Services Consolidated

The National Supply Company's Engine division has completed a consolidation of its sales and service facilities with those of the Atlas Imperial Diesel Engine Company, according to F. H. Kilberry, Engine Division General Manager. The purchase of the assets of the Atlas Engine Company by the National Supply was consummated on July 24, 1950.

Oil Man Named to Tulsa Bank Board

Philip H. Bohart, vice president of Gulf Oil Corporation, has been elected a member of the board of directors of National Bank of Tulsa. The bank also announced the promotion of Walter J. Eyestone to vice president.

Brooks Joins Petroleum News

Petroleum News Corporation, publishers of *Five Star Oil Reports,* has appointed R. P. Brooks of Dallas as editorial manager of its Dallas offices. For the past ten years, Brooks has been oil editor of the Dallas *Times-Herald;* previously, he was oil editor of the Shreveport *Journal.*

Mail Coupon for Yours Today... It's FREE!

Drillers—here is an easy, surer way to establish the correct time to cut off drilling lines. When you know this, you can prevent the overloading that reduces the ton-mileage a line gives you. And, you can more often avoid the line breaks that result in costly fishing operations.

The Union Ton-Mile Indicator is easy to use. With it you get a Union Log Book to help you keep your well records. To measure ton-mileage, all you do is set the figures from your log book on the indicator and read the answer. All the complicated figuring is done for you. Mail the coupon below to have yours delivered and demonstrated to you.

USE **Tuffy**® ROTARY LINES

They employ a unique construction and special steels to provide extra resistance to abrasion, drum crushing, shock loads and internal friction. Tuffy ***Jackknife*** *Rotary Line is specially designed to move at higher speeds over the smaller sheaves and drums of the* ***Jackknife*** *rig. Tuffy* ***Standard*** *Rotary Line is designed for* ***Standard*** *rigs and for deeper drilling on* ***Jackknife*** *rigs. They are easy to order. Just specify Tuffy* ***Standard*** *Rotary Line or* ***Jackknife*** *Rotary Line, the length and the size. No complicated specifications.*

union Wire Rope corp.

2104 Manchester Ave. Kansas City 3, Mo.

Gentlemen: Please have your Union fieldman deliver my Ton-Mile Indicator and explain its use.

Name_____

Address_____

City_____ Zone_____

State_____

Rummerfield Joins Century as Manager of Seismic Operations

Ben F. Rummerfield has resigned as assistant manager and geophysical supervisor in Mexico for Seismograph Service Corporation to become manager of seismic operations for Century Geophysical Corporation, Tulsa. He is a Colorado School of Mines graduate and in 1940 joined SSC as party chief in the Mid-Continent and Rocky Mountain areas. In 1945 he went to Venezuela and Colombia as geophysical supervisor, returning to the U. S. in 1947 and then going to Mexico where he assisted in setting up SSC's geophysical operations in the Bay of Campeche.

Chiksan Names Five Representatives

Chiksan Company has named the following representatives: Robert S. Hudgins, Jr., Charlotte, N. C., North and South Carolina; R. S. Stover Company, Marshalltown, Iowa, Iowa and Nebraska; George S. Thomson Company, Phoenix, Ariz., Arizona; Joseph W. Eshelman & Company, Inc., Birmingham, Alabama and parts of Tennessee and Florida; and Rittelmeyer & Company, Inc., Atlanta, all of Georgia and part of Florida.

LeBus ALL PURPOSE SNATCH BLOCK

The World's Finest
SNATCH BLOCK

- EASILY ASSEMBLED or disassembled in difficult places
- Line can be inserted easily in any difficult position
- No tools needed for assembly or disassembly
- Can be used with either wire line or manila rope
- No Accidental opening by jarring or vibration
- No losing of parts
- No threaded nuts or bolts to burr, foul or lose.
- No sparking danger around gas or oil
- Oil and dust seal for bearing

For Safety, Strength and Durability, LeBus Snatch Blocks meet the World's best tests. The LeBus Snatch Blocks may be readily adapted for all purposes through their complete interchangeability of parts. They are completely drop forged of alloy and high carbon steel and are thoroughly heat treated for strength and durability. LeBus Snatch Blocks are given the full strength test before leaving the plant and are fully guaranteed.

WRITE FOR BULLETIN

LEBUS

BUY FROM YOUR SUPPLY STORE

LEBUS ROTARY TOOL WORKS

P. O. BOX 2352 LONGVIEW, TEXAS L. D. Phone 5

Hendrickson Joins A. O. Smith As Welding Equipment Sales Manager

A. G. Hendrickson has joined A. O. Smith Corporation as welding equipment sales manager. He will function under Welding division sales manager L. F. Vonier, who previously had actively managed sales of both welding electrodes and welding machines.

A. G. Hendrickson

Hendrickson was formerly with the Harnischfeger Corporation as assistant manager of the Welding Sales division.

Oil Well Supply Company Promotes Winstead to General Sales Manager

The promotion of K. B. Winstead to general manager of sales for the Oil Well Supply Company was announced.

K. B. Winstead

Winstead, a veteran of 30 years' service with "Oilwell," has served as assistant general manager of sales for the past three years. He succeeds M. F. Hazel who recently was appointed director of engineering for the supply firm.

In his new position Winstead will be responsible for coordinating sales activities of "Oilwell's" six domestic divisions and the export division, as well as directing the line organization of the general sales department.

Wilson-Snyder Manufacturing Division of Oil Well Supply Company soon will materially expand its line of centrifugal pumps, Fred F. Murray, president, announced. The Wilson-Snyder plant is at Braddock, Pa.

The additional line includes 19 general purpose centrifugal pumps ranging from 5 to 250 horsepower of a type formerly manufactured by the National Transit Pump and Machine Company of Oil City, Pa., which liquidated all of its properties early this year.

Crane Names Assistant Manager

J. W. Greene has been appointed assistant manager of the Valve & Fitting department, Crane Company, Chicago. He has had 12 years' experience in the oil fields of the southwest, ten years in the New York and eastern industrial markets, and five years in the Midwest. He was formerly sales manager of Crane's New York branch.

Goleman Joins M. J. Delaney

R. E. (Red) Goleman, for 12 years with the Houston Oil Field Material Company in charge of the fishing tool division, has become associated with M. J. Delaney Company of Dallas. He will be in charge of all drilling operations and will make his headquarters in Dallas.

EQUIPMENT and SERVICE SUPPLIERS' NOTES

United Geophysical Company Makes Office and Personnel Changes

United Geophysical Company has moved its Midland, Texas, office to 407 North Garfield.

Other company announcements were that Duncan D. Robinson had been named party chief on United's seismic crew in Kuwait, Persian Gulf, and that L. A. Martin has returned from an extended trip to the Middle East inspecting operations in that area.

Hall Joins Strata-Crete Division As Manager of West Coast Sales

Don Hall has been appointed division sales manager for the sales of Strata-Crete and Strata-Seal, two products recently made available to the oil industry by Great Lakes Carbon Corporation. Previous to this appointment, Hall was sales manager for the McCullough Tool Company. Prior to that he was district superintendent with the Lane-Wells Company.

Don Hall

The division that Hall will be responsible for embraces California, San Juan Basin, Nevada and Utah. He will maintain headquarters at the main offices of the Strata-Crete division at 5845 Atlantic Avenue, Long Beach 5, Calif.

C. P. Whitmire Appointed Sales Representative by Hobart Company

Clyde P. Whitmire has been appointed special factory representative to the oil industry by Hobart Brothers Company, Troy, Ohio, manufacturers of arc welding equipment.

C. P. Whitmire

Whitmire was with A. O. Smith Corporation for five years as a field welding engineer. In his location at 1812 North Boston Place, Tulsa 6, Whitmire's primary activities will be in oil field, pipe line and petroleum industry sales.

Tulsa Company is Incorporated

Don R. Hinderliter, president, Oil Field Specialties Company, Tulsa, has incorporated his company as Don R. Hinderliter, Inc. It handles drilling and fishing tools, manufactures well head equipment, tubing heads and other oil industry materials.

Forsyth Joins Galvanizing Company

K. F. (Ted) Forsyth resigned as sales manager of Emsco Derrick & Equipment Company, Los Angeles, to become vice president and general manager of Los Angeles Galvanizing Company, in which he has purchased an interest.

CATAWISSA
DOUBLE UNION SWING CHECK VALVE
"502"

FULL OPENING FOR 100% UNOBSTRUCTED FLOW!

COMPACT!
EFFICIENT!
ECONOMICAL!
EASILY ACCESSIBLE!

flow line and pipe line type for general oil country use in either horizontal or vertical position!

CATAWISSA Double Union Swing Check Valves are designed and recommended for rough and ready demands of oil country applications — for use in lines where no stop is installed close to the check valve and where pipe cleaning mechanisms (go-devils) are used. They are FULL OPENING, furnished with Catawissa PERFECT SEAL Unions on both ends, eliminating the use of a full union and nipple necessary to install regular type check valves! Can be easily cleaned or repaired on the line — with check holding line contents!

REFAX METAL BODIES
HITENSILOY WORKING PARTS
★
500-lbs. SERVICE O.W.G.
1500-lbs. TEST
250-psi WSP
★
SIZES 2" to 4"

SEE OUR CATALOG IN THE COMPOSITE CATALOG

stocked and distributed by
OIL WELL SUPPLY CO.
Branches Serving All Oil Fields

WRITE FOR FREE CATALOG 11 SHOWING THE COMPLETE CATAWISSA LINE

CATAWISSA VALVE & FITTINGS COMPANY
60 MILL STREET ★ CATAWISSA, PENNA.

Construction Work Is Started on Alcoa's Alumina Plant at Bauxite

Aluminum Company of America has begun construction of a new alumina plant near Bauxite, Ark.

Designed to process low-grade bauxite ore, the new plant will increase by nearly 50 percent the amount of alumina now being produced by the company. Alumina is the refined ore from which basic aluminum is obtained by the smelting process.

To be operated by Aluminum Ore Company, wholly-owned subsidiary of Aluminum Company of America, the new plant will be situated on a 200-acre site adjoining the bauxite mining operations of Alcoa Mining Company, also a wholly-owned subsidiary of Alcoa.

GM Distributor Widens its Field

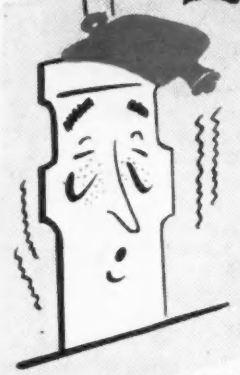
Taylor Machine Works, South and Central Mississippi distributor of General Motors diesel engines for industrial applications, has recently expanded its operation to include GM diesel sales and service to the petroleum industry.

In Charge of New Coates Office

R. R. Scallorn has been transferred from the Coates Field Service, Inc., Oklahoma City office to Wichita where he will take charge of a new office.

ARE YOUR WELLS SUFFERING FROM

PARAFFINITIS*?

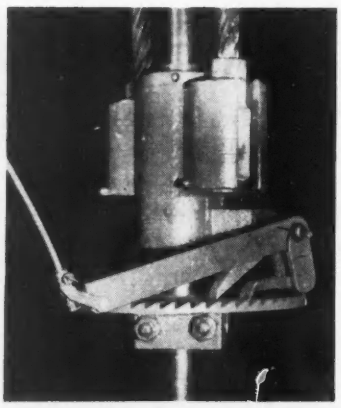


Wells afflicted with this disease can be cured by the installation of Huber Paraffin Scrapers. They are not just a temporary relief, but a Permanent Cure. Your wells will never again need costly steaming out or the rods pulled to keep them on production.

Huber scrapers, shrink-fitted to the rods and placed in the area of accumulation, wipe the tubing walls clean of paraffin as the rods are rotated and reciprocated. It is as simple and efficient as that.

ROTATION . . . a double benefit

Huber scrapers combined with a Huber Rotating Rod Hanger give double benefit in paraffin removal. The resulting rotating and reciprocation motion wipes paraffin from the tubing in particles so small that they go out in solution . . . can not clog tubing, scrapers, or flow lines. Double benefit rod rotation prolongs coupling life by equally distributing wear . . . prolongs pump life and efficiency by equalizing wear on working barrel.



* Congestion caused by the accumulation of paraffin in pumping wells.

For further information see your local supply store, or write

J. M. HUBER CORPORATION,

Box 831 . . . . . Borger, Texas

HUBER

PARAFFIN SCRAPERS

SCRAPE AS THEY ROTATE AS THEY RECIPROCATE

Westinghouse Air Brake Company Elects Three New Top Executives

Edward O. Boshell, utility executive, has been elected chairman of the board and president of The Westinghouse Air Brake Company and its subsidiary, The Union Switch and Signal Company. He has also been elected a director of both Pittsburgh companies. A. N. Williams, who has served as president of both companies since 1946, has been elected vice chairman of the board. Herbert A. May, who has been with the companies since 1936, was named senior vice president.

Edward O. Boshell

Boshell has been chairman of the board and president of Standard Gas and Electric Company, New York, and of Philadelphia Company, Pittsburgh, and will continue in a consultative and advisory capacity to the utility organization.

Dorroh Joins Distributing Firm As Sales and Warehouse Manager

Olive Dorroh has been appointed manager of sales and branch warehouses for Petroleum Distributing Company, and will headquarter in the company's main offices in Houston. Dorroh has been in general oil field supply business for the past 25 years. In his new post he will coordinate sales and services of the company's 18 warehouses.

Olive Dorroh

Altens Warehouse Is Established

Altens Foundry & Machine Works has opened a new warehouse at 206 Michigan Street in Wichita Falls, Texas, to serve supply stores throughout the Southwest. Ted Michie has been named warehouse manager. The warehouse is fully stocked with Altens equipment and is offering 24-hour service.

Warner Gear Names Representative

R. R. Rolph has been appointed Detroit sales representative of Warner Gear division of Borg-Warner Corporation. His offices are at 7-233 General Motors Building.

Bethlehem Transfers Personnel

Bethlehem Supply Company announced the following personnel changes: R. C. Repp, formerly store manager and field representative, Beaumont, Texas, transferred to Houston store as field representative and succeeded by B. E. Young; R. E. Carlington, transferred from Tulsa to Midland, Texas, as engineering representative.

New Books

Geological Digest

Tulsa Geological Society has published its 18th Annual Digest, which contains in its 154 pages abstracts and summaries of papers dealing with a wide variety of subjects of both local and regional geologic interest. A gravity map of the U. S. and a paper discussing this map and certain of its gravity features is included. There are 12 illustrations. O. E. Wagner, Jr., Wilcox Oil Company, is editor of the volume, and V. L. Frost, The Ohio Oil Company, manager.

V. L. Frost, The Ohio Oil Company, Thompson Building, Tulsa. $1.

Highway Safety

A popular film on highway safety, "Screw Drivers and Screw Jays," has been completely modernized and reissued by Shell Oil Company, producer of the film. Originally produced in 1940, the picture portrays some of the foolhardy acts typical of thoughtless motorists and pedestrians.

The 16-millimeter sound film was modernized in order to conform to increased traffic conditions and to improvements in automobile design and highway construction during the last decade.

The film was produced in cooperation with the National Safety Council.

Shell Oil Company, Film Library, Box 2099, Houston 1, Texas.

Jersey Standard Papers

Technical papers published by scientific personnel of Standard Oil Company (N.J.) and affiliates in 1948 have been collected in a new volume, "Technical Publications —1948."

The 24 papers reprinted in the 512-page volume were chosen from more than 100 published by Jersey Standard technologists during the year. They cover a variety of subjects relating to oil and gas production and manufacturing, and are well illustrated with photographs as well as drawings and charts. Included also in the book are short biographies of the authors and a selected list of other 1948 publications. Arman E. Becker edited the papers.

Standard Oil Company, (N.J.), 15 West 51st Street, New York 19.

Water-Flooding in Illinois

"Summary of Water-Flooding Operations in Illinois, 1950," is a report on a joint survey by the State of Illinois and the Interstate Oil Compact Commission, prepared by Frederick Squires, chairman, and members of the Secondary Recovery Study Committee for Illinois.

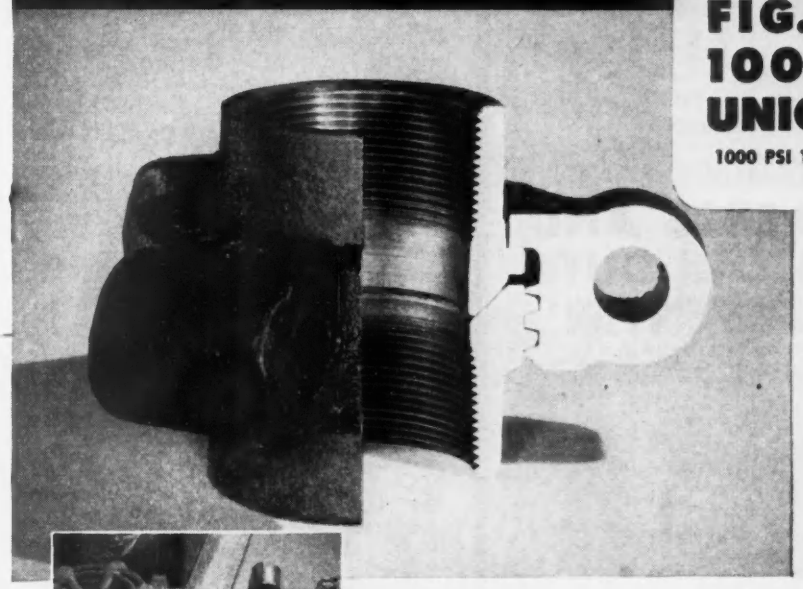
This pamphlet contains a summary report of six of the water floods now operating, and data on all of the 31 controlled water floods reported by the Committee. A foreword by Governor Adlai E. Stevenson points out the importance of these operations to the people of Illinois.

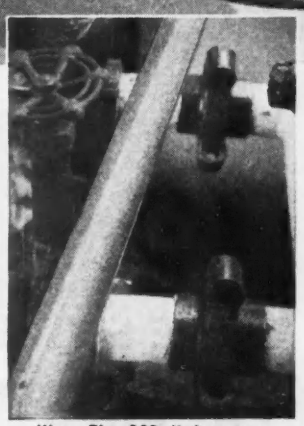
In addition to the tabulated data and description of six of the floods, there are 27 illustrations, including an index map, development structure maps for many of the projects, and graphs of the production history.

Interstate Oil Compact Commission, P. O. Box 3127, State Capitol, Oklahoma City 5.

EXACTLY RIGHT FOR THE JOB!

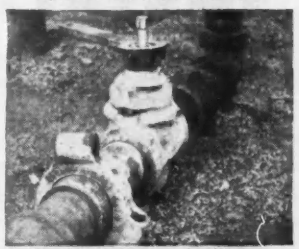
WECO FIG. 100 UNION
1000 PSI TEST





Weco Fig. 100 Unions are exactly right for connecting steel mud tanks.

Fig. 100 Unions are exactly right for fuel line connections.



Exactly right for simplifying valve installation maintenance.

MEANS 100% EFFICIENCY in Make-up, Service, Economy

Designed for 1000 lb. test pressures, Weco Fig. 100 Unions are exactly right for separator and tank connections, fuel and water lines, manifolds, headers and other connections on lines with working pressures of approximately 500 lbs.

The ball and cone seat makes a positive, leak-proof seal. Fig. 100 Unions are made of tough and durable malleable iron . . . withstand repeated use in hard service. You can make them up fast with a hammer blow on the bar nut lugs, or with a bar through the holes in the nut.

For longest service and greatest economy on low pressure line connections use the Union that is exactly right for the job . . . WECO FIG. 100 UNION. Available in sizes 2" through 8".

WECO

WELL EQUIPMENT MFG. CORP.
Subsidiary of Chiksan Company
HOUSTON 1, TEXAS
Exclusive Sales Representative Outside Mid-Continent Area
CHIKSAN COMPANY
Brea, Calif. Chicago 3, Ill. Newark 2, N. J.
Export Sales CHIKSAN EXPORT COMPANY, Brea, Calif. Newark 2, N. J.

Manufacturers and Distributors of Oilfield, Refining, Marine and Industrial Equipment

DRILLING EQUIPMENT MFG. CO.
DEMCO
OKLAHOMA CITY, OKLA. U.S.A.

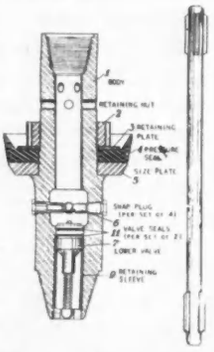
COMBINATION
CASING AND BLOW-OUT PREVENTER, TESTER

Are you insured against disastrous blowouts?

Don't guess . . . Be Sure! Be Safe! Get the Demco Combination Casing & Blowout Preventer Tester.

- Blowout Preventer can be tested at any pressure without excessive pressure against pump.
- Casing can be tested at any depth—without applying pressure against formation; without pulling vacuum or swabbing hole when coming out after test has been made.

Part Nos. 3, 4 & 5 are removable and may be replaced with corresponding parts of different size for various size casing.



Always specify Demco Products for Safety, Service & Economy.

EXPORT OFFICE:
233 Broadway, New York 7, N. Y.

DRILLING EQUIPMENT MFG. CO.
OKLAHOMA CITY, OKLAHOMA
PHONE 6-1342 845 S.E. 29th St. Box 4272

SQUEAKS from the BULLWHEEL

Grim Fairy Tale

Once upon a time a beautiful girl was walking through the woods when she came upon a poor little frog who spoke, "Lady, once upon a time I was a handsome prince, but a big black witch turned me into a frog."

"Oh, that's too bad," said the beautiful girl. "Is there anything I can do to help you?"

"Yes, indeed," replied the frog. "If you will take me home with you and put me on your pillow I will be saved."

So the beautiful girl took the poor little frog home with her, and the next morning when she awoke, there beside her was a handsome young prince.

And, do you know, to this day her mother still doesn't believe that story.

Needs Revitalizing

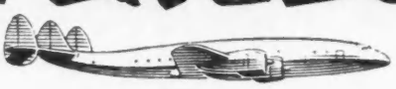
Discussing the peculiar Texas liquor laws the other day, one fellow remarked that it's just as well that you can't buy a drink in that state, because the modern cocktail served in bars is nothing more than an ice cube which has been given an alcohol rub.

Historical Background

The Ark sprang a leak during the great flood. Noah sent his dog to stick his nose in the hole. The hole grew larger and larger. Noah sent his wife to stand over the leak and stop the icy waters. The hole grew still larger. Noah, himself, went below and sat over the hole, which now was of immense proportions. And that, gentle reader, is why a dog's nose is always cold, a woman's feet are always cold, and also why men always stand with their backs to a fireplace.

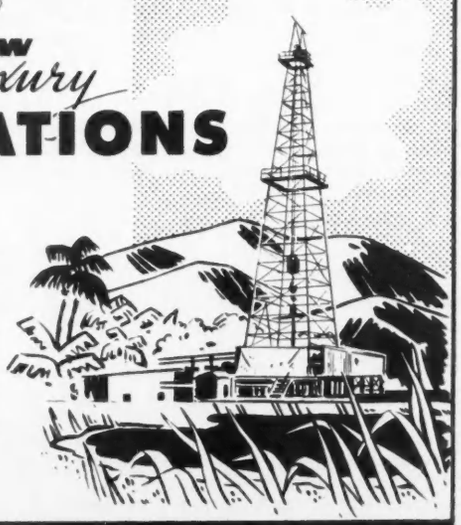
". . . it's clearing now . . . yes, it's plain . . . You'd better spud in 100 yards north of your present location."

FASTEST SERVICE TO
VENEZUELA



C&S NEW *Luxury*
CONSTELLATIONS

Flights each way every day aboard C & S New Luxury Constellations through the New Orleans gateway offer 300-m.p.h., pressurized cabin service to the oil fields of Venezuela. One carrier service from Houston, St. Louis, Chicago and Detroit, with connections at New Orleans to and from Dallas, Tulsa, Los Angeles and San Francisco. For reservations call the nearest C & S ticket office or your Travel Agent.



CHICAGO & SOUTHERN AIR LINES
GENERAL OFFICES • MEMPHIS 2, TENN.

McCULLOUGH SERVICES:

A ELECTRIC WIRE LINE SERVICES

1. PERFORATING—Deepest penetrating burrless bullet and jet.
2. BRIDGING PLUGS—Drillable, expandable. McCullough and Baker.
3. MAGNA-TECTOR*—Locates stuck point of pipe, accurately, fast!
4. JET CASING CUTTERS*—World's fastest casing, tubing, drill pipe cutter!
5. JET BACK-OFF TOOL* and STRING SHOT—World's fastest way to recover stuck pipe!
6. JET BOTTOM HOLE CUTTERS*—Fragmentizes lost or stuck fish!
7. ELECTRONIC WEIGHT INDICATOR*—Supersensitive, small, light!
8. SONIC COLLAR LOCATOR*—Locates collars, liner top, well bottom, etc.
9. MAGNETIC FISHING TOOL*—Surface indicates location and recovery of fish.

B ROTARY SERVICES

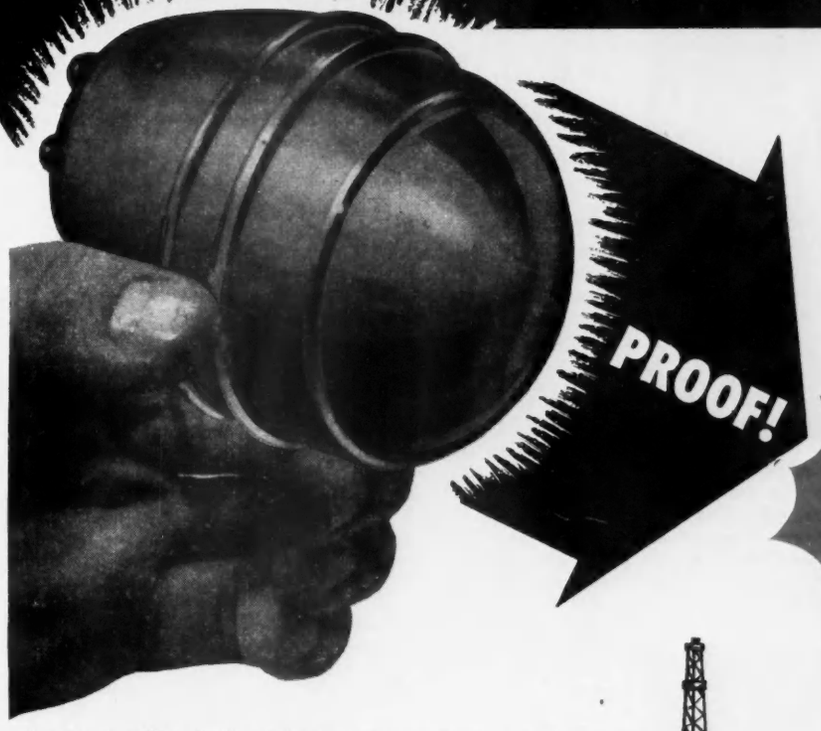
1. DOUBLE ACTING ROTARY JARS* and BUMPER SUBS—Reduces number of fishing jobs!
2. SAFETY JOINTS—Releases quickly in emergencies!
3. EXTERNAL DRILL PIPE CUTTERS—For all outside pipe cutting.
4. MECHANICAL LONG KNIFE INTERNAL CASING CUTTERS—All sizes pipe, tubing.
5. THIN WALL EXTERNAL CASING CUTTERS*—For outside cutting in small clearances!
6. ROTARY RELEASING OVERSHOTS—Completely encircles fish.
7. ROTARY RELEASING SPEARS—Engages or disengages at will.
8. GUN TESTER—Water shut-off, perforating, testing in one run.
9. JUNK BASKET—Crushable finger type. 5 minutes on bottom.

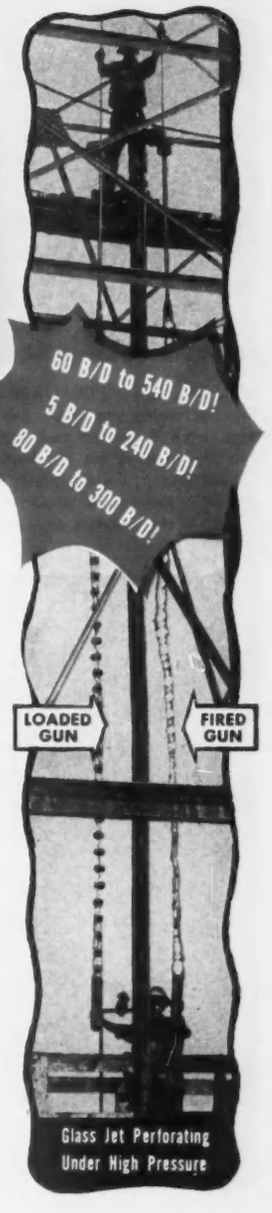
*Exclusive McCullough Services

PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION MEMBER

McCULLOUGH® GLASS JET PERFORATORS

Mean MORE OIL in the tank, even after all other methods fail!





MORE *Oil in the TANK means MONEY in the BANK...*

...and that's what you're after!

When you want cleaner, deeper, straighter holes, even after all other methods had failed to get results, there is only one choice—the new McCullough Glass Jet Perforator. Your reward—MORE OIL in the tank, MORE MONEY in the bank! No carrots or slugs, no splitting or sticking guns, trouble-free jet perforating for the FIRST time!

No matter how you look at it the McCullough Glass Jet Perforator makes sense. The emphasis is on the Glass Jet and not on the carrier. This permits the maximum safe charge of explosives where MORE POWER is needed—in small pipe in deep wells where several casing strings exist. The special heat treated glass units disentegrate completely. The retrievable strip carrier is pulled from the well.

Whatever your perforating problems—you're after MORE OIL in the tank. GET what you're after with the McCullough Glass Jet Perforator!

AVAILABLE NOW—See Your McCullough Service Man TODAY!

McCULLOUGH Tool Company

5820 South Alameda Street, Los Angeles 58, Calif. • 405 McCarty Street, (P.O. Box 2575) Houston, Texas
Export Office: Los Angeles, California

TEXAS: Snyder, Alice, Houston, Cisco, Corpus Christi, McAllen, Odessa, San Angelo, Tyler, Victoria, Wichita Falls. **OKLAHOMA:** Oklahoma City, Guyman, Healdton. **MISSISSIPPI:** Laurel. **NEW MEXICO:** Hobbs. **KANSAS:** Great Bend. **CALIFORNIA:** Los Angeles, Avenal, Bakersfield, Ventura. **LOUISIANA:** Houma, Lake Charles, New Iberia, Shreveport. **WYOMING:** Casper. **CANADA:** Edmonton. **VENEZUELA**—United Oilwell Service Co., S.A.: Caracas, Anaco, Maracaibo.

Mid-Continent NEWS and HUMOR?

AHH, SPRING . . . GLORIOUS SPRING! It is almost time for spring you know, and when the birds and bees begin to twitter and buzz, Mid-Connie really gets the urge to hit the highway on some of her famous trips . . . and brother, what happens to that gal when she travels is really sumpthin'. She gets caught in the darndest situations you ever heard of!

BY THE WAY, Irene, of "Goodnight Irene, Goodnight" fame, was put to bed in a big way at the opening of Mid-Continent's new store in Farmington, New Mexico. Mid-Connie was her chaperon, and the fur really flew before Irene murmured her last "Goodnight, Big Boy." The story was in the Mid-Autumn issue of the MID-CONTINENT NEWS . . . the company magazine reporting news of interest to employees and friends of . . .

MID-CONTINENT Supply Company

General Offices Mid-Continent Bldg. FORT WORTH, TEXAS

SQUEAKS FROM THE BULLWHEEL

Vice Is Nice

"Doc," complained the patient, "I've been having severe headaches. See what you can do about it."

"Been smoking much?" asked the doctor.

"Never touch tobacco," replied the patient.

"How about drinking?" asked the doctor.

"Never take a drink," replied the patient.

"What about women, play around much?" asked the doctor.

"Haven't had a date for 20 years," said the patient.

"Well, then, my friend," summarized the doctor. "The only thing that could be the matter with you is that your halo fits too tightly."

Tee-Zone Troubles

It was his first golf tournament. He was nervous. He teed his ball, swung . . . and missed. He tried again . . . missed. A third time . . . missed. Then he turned around to the spectators behind him and smilingly said, "Tough course, ain't it?"

All Put Out About It

The Washingtonian boarded a Pennsylvania train one afternoon at Union Station, and as he seated himself, called the porter aside. "George," he said, "I'm on my way to Philadelphia for my daughter's wedding, and I've just got to be there on time. But right now I'm dog-tired, and I've got to get some sleep. It's going to be your job to wake me up, and I warn you that I'm a devil when somebody tries to wake me up. I'll probably argue and fight, and maybe even kick you, but you've just got to get me off this train in Philadelphia." A five-spot sealed the deal, and the train rolled away.

It was late at night when the traveler woke up, glanced around, and discovered that he was in the same train, same seat, and at the New York railroad yards. Livid with rage, he sought out the porter.

"Why in hell didn't you wake me up when we got to Philadelphia? I told you how important it was, and you low-down, thieving rascal, you didn't put me out!"

"Yessir, I know you are mighty angry, sir," calmly replied the porter, "but you sure aren't half as mad as that gentleman I put off the train in Philadelphia."

Gem of a Story

Getting pearls for nothing frequently requires getting into deep water, according to one sweet young thing.

Just Good Friends

An oft-married movie star met a pretty lass at a Hollywood cocktail party. "Hello there," she greeted him, "don't you remember me? Ten years ago you asked me to marry you."

"Really," yawned the actor, "and did you?"

Qui Vive!

Explaining why he had stayed on in Casablanca after the end of WW II, the ex-GI said that he found himself a girl friend who was Free, French, and—unoccupied.

She Heard the Call

When papa told Jenny Lou that the mortgage was due on the old homestead and the money with which to pay it was lacking, she said:

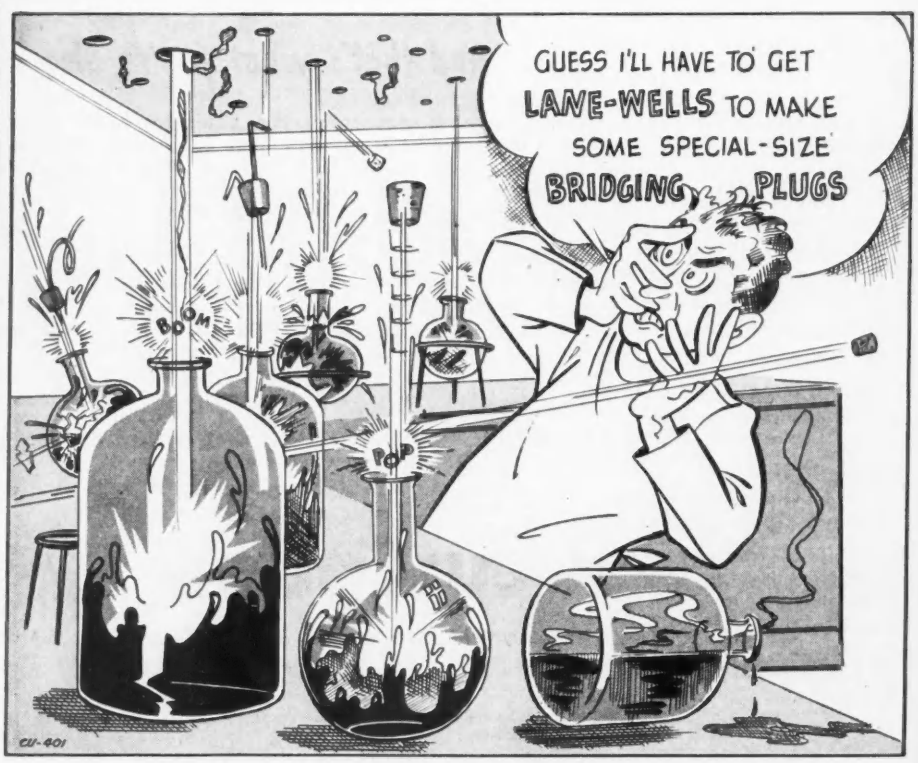
"Quit your worrying, papa, I'll pay the mortgage."

"Jenny Lou, have you got $2000?" asked papa.

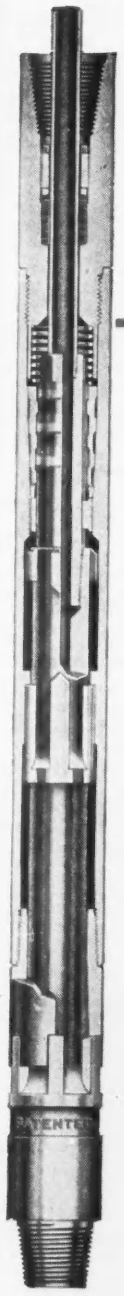
"Yes, papa," said Jenny Lou. "I've saved my money and it is in the bank."

"Jenny Lou," questioned papa, "have you been a good girl?"

"Papa," replied Jenny Lou, "to get $2000 you have to be good!"



Engineered TO SPEED UP FISHING JOBS!



WHEN you have any type of fishing work—jarring, cutting, pulling, backing off, recovering junk, or any of a dozen similar jobs—put Bowen Fishing Tools to work on your rig!

Bowen—through more than 30 years of engineering new tool designs, new improvements—has developed a complete line of fishing tools that help you speed the work . . . reduce the risk . . . and cut the cost on all your fishing operations. For your fishing jobs, get the important extra advantages of such features as . . .

A STRAIGHT-PULL FISHING JAR that requires no dangerous torque for operations, yet is fully adjustable for intensity of blow while in the hole, is faster in operation, has no delicate mechanisms. . . .

A SIMPLE, SAFE ROTARY SPEAR with a releasing mechanism that has never been known to fail on any job and with operating and construction features that make it ideal for all spear work. . . .

A RELEASING OVERSHOT incorporating a special spiral grapple that cinches tighter as pull increases and catches drill pipe, coupling or tool joint—whichever is up—without adjustments. . . .

A POSITIVE-ACTING JUNK BASKET that utilizes a reverse circulation principle to pull junk into the basket instead of forcing it away, and permits full pump pressure to be applied.

There are many more tools in the complete Bowen line that offer equally outstanding features for safety, positive operation and consistently better results on any fishing job. Why not get acquainted now with the Bowen Fishing Tools that year-in and year-out set performance records in oil fields everywhere? Bowen Tools—sold outright for export use only—are fully described in your Composite Catalog . . . or write for your individual copy of the complete Bowen Catalog—today!

SR BOWEN CO

MAIN OFFICE AND PLANT:
11008 SOUTH NORWALK BOULEVARD
SANTA FE SPRINGS, CALIFORNIA
EXPORT OFFICE:
30 ROCKEFELLER PLAZA
NEW YORK CITY, NEW YORK
EXPORT REPRESENTATIVE: VAL. R. WITTICH, JR.

RADIO-TELEPHONE BY HINDERLITER SAVES DAY

HINDERLITER salesman Blondie Larson shows how, in a matter of minutes, he started a needed part on its way to the Scurry Field and thereby saved days of "down-time" at a well.

Last November an operator in the Scurry Field of West Texas was in a jam. He had a well out of operation. At his supply store he wasn't able to get a particular part and was told that it would be several days before a new shipment arrived.

Just then he met Blondie Larson, HINDERLITER salesman working out of Odessa. When Blondie heard of the dilemma he walked to his parked car, called the HINDERLITER factory in Tulsa by radio-telephone and the needed part was on its way to the supply store by air freight within an hour.

The widely scattered operations of the oil industry often make contact by telephone difficult or even impossible. That's why HINDERLITER customers find it so convenient to use HINDERLITER radio-telephones when service or equipment is needed. No matter where he may be in the field, your friendly HINDERLITER salesman is still as near as your telephone. For complete information on how to profit from HINDERLITER fast service, discuss it with your HINDERLITER salesman on his next visit or contact the factory at Tulsa. Adv.

HINDERLITER TOOL COMPANY, DIV.

H. K. Porter Company, Inc.

Drawer 2650 Tulsa, Okla.

SQUEAKS FROM THE BULLWHEEL

Sporting Blood

"Daughter," sighed the Arkansas farmer. "I guess it's just my pride, but I do wish you could outrun somebody besides Grandpa."

She Didn't Slip, She Fell

"Just a minute," he said. "I thought I heard something break."

"Think nothing of it, Dear," she replied. "That was just my promise to Mother."

Duo-Purpose

Since this is an off-year as far as federal elections are concerned, it's safe to remark that a congressman goes back home every two years to rebuild the fences he expects to straddle later.

Qualification

"For $500 I'll endorse your cigarettes," offered the glamor girl.

"I'll see you inhale first," replied the stubborn advertising man.

City Ways

"She's a new girl with us and just fresh from the country so we'll have to show her what's right and what's wrong," said the sales manager to his assistant.

"Very good, sir," replied the assistant. "You show her what's right."

". . . The most dreadful thing! I ALMOST made a slip and told the president's secretary about how you were offered all those leases in Scurry County and turned them down . . . but I caught myself just in time. By the way, isn't it about time I had a raise?"

Good Gnus Tonight

I've got gnus for you, shyly said the Mother Gnu to the Father Gnu when he came home from work.

Broad Shoulder and Quick Ear

Sympathy, it has been said, is what one woman gives another in exchange for all the details.

Prompt Attention Given to Foreign Orders

"THE LUSTROUS SEVEN STAR BEAUTY"

World's Best Map Filing Cabinet

CONVENIENT • INSTANT REFERENCE • SPACE SAVER • INSTANT FILING
DUST PROOF • RUST PROOF • MEDDLER PROOF

Ultra Attractive fits the furniture scheme of any office.
Instant Adjustment—for maps or tracings from 12" to 54" long. Each Well 2" x 2", equipped with individual wood slide with holes on 2" centers, through which one screw when matched to hole in adjustment block and tightened, automatically gives perfect alignment at top for all length maps. Substantial lock—Individually keyed.
Exterior of cabinet made of 3/4" five ply beautiful grained hardwood mitered locked joints, banded edges on door and top. Interior partitions 3/8" thick, and 1/4" slides, all three ply veneer of southern hardwood or fir.

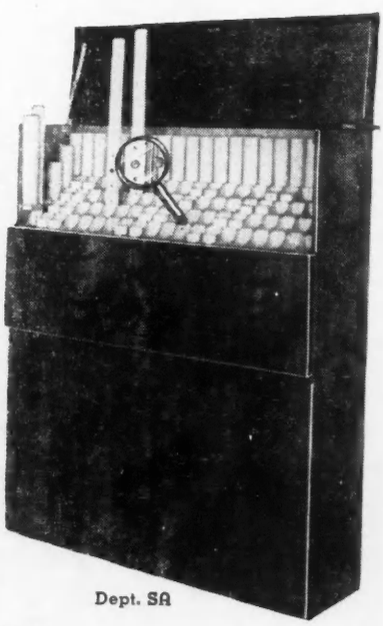
OVERALL DIMENSIONS—AND PRICES

Capacity	Width	Height	Depth	Price
60 "	29 3/8"	57"	13 3/4"	$107.25
75 "	36 3/8"	57"	13 3/4"	123.75
100 "	47 7/8"	57"	13 3/4"	140.25
160 "	47 7/8"	57"	20 1/4"	183.75
200 "	59 1/2"	57"	20 1/4"	217.25

All prices are F.O.B. Houston, Texas.
Delivery: From ten to thirty days.

Finished: Walnut, Oak, Mahogany, Olive Drab Green, Natural or Blond. Other type cabinets designed to suit your needs. Information on request.

We specialize in Drafting Boards, Light Tables and other types of cabinets, made to your specifications.



Dept. SA

PORT CITY CABINET WORKS

609-13 Quitman St. HOUSTON 9, TEXAS Phone PR-0725